EQUIPMENT ECONOMIES
NUMBER—MARCH, 1951

Railway Engineering and Maintenance

The Line of The Dixies—
The Flagler

There's real travel enjoyment in riding The Dixie Line when bound for Florida because of these Ultra Modern Trains and Smooth Riding Track.

THE P. & M. CO.

ICAGO • NEW YORK • DENVER • WASHINGTON • ST. LOUIS • CLEVELAND • ST. PAUL • BOSTON • SAN FRANCISCO
MEXICO D. F.

these "Maintenance Men" never sleep

When you use Reliance Hy-Pressure Hy-Crome Spring Washers on rail joint bolts, it's like having a maintenance man at each bolt ready to tighten the nut the instant looseness develops.

These "maintenance men" never sleep. Every second of every hour —day and night, winter or summer—their powerful coil-spring, reactive pressure keeps the bolted assembly under tension, instantly—automatically—"taking up" looseness resulting from wear, bolt stretch or temperature change.

They reduce the need for maintenance tightening, retard joint deterioration, cut maintenance costs and keep track open for speedy delivery of vital material for the nation's defense.

There's a Reliance Hy-Pressure Hy-Crome Spring Washer for every service condition and bolt size—scientifically designed for the particular requirements—fabricated from cold drawn alloy spring steel, uniformly heat treated to develop maximum non-fatiguing reactive force.

Try them where your maintenance problems are toughest and see for yourself why they are the choice of well-kept roads around the world.

The Edgemark Of Quality

EATON

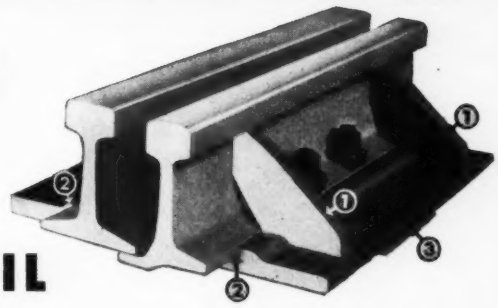
EATON MANUFACTURING COMPANY

RELIANCE HY-PRESSURE HY-CROME SPRING WASHERS

EATON **RELIANCE DIVISION, MASSILLON, OHIO**

Sales Offices: New York, Cleveland, Detroit, Chicago, St. Louis, San Francisco, Montreal

IT'S A PATENTED FEATURE OF BETHLEHEM'S 751 HOOK-FLANGE GUARD RAIL



Yes, that unique "dip-down" flange identifies the guard rail that's been called the safest ever made. But the flange is more than a mark of identification. It does a job—an important job.

As the illustrations show, it passes under the running rail, fitting snugly into the recesses of special tie plates. The weight of the train thus keeps the guard rail from overturning, no matter how sharp the side thrust.

But there are other great safety features, too. Note (1) the heavy welded side braces; (2) the double-shoulder construction of the tie plates in the straight guarding area; (3) the welded reinforcing plate that prevents spreading and adds stiffness.

Bethlehem's Model 751 meets the growing demand for a completely rigid guard rail. There are, in addition, three other models (750, 752, 753) to fit the requirements of individual railroads. Why not ask a Bethlehem man for full details? He'll be glad to explain the features that have made these guard rails the choice of leading roads the country over.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

★ BETHLEHEM STEEL ★

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AVOID FROZEN JOINTS . . . use Texaco Rail Joint Lubrication

Frozen joints, pull-in-twos, corrosion, bolt breakage—all are virtually eliminated with Texaco Rail Joint Lubrication. Joints packed with *Texaco 904 Grease* and sealed with *Texaco Plastic Material "H"* are immune to these ills because they are protected against dirt, moisture, and brine drippings from refrigerator cars.

Texaco Rail Joint Lubrication is quick, easy and economical. Seal joint ends and bottoms with *Texaco Plastic Material "H"*, then pump *Texaco 904 Grease* into the joint through applicator pipe. The job is a matter of minutes and is done under traffic without taking the joint down. Properly applied, the protection lasts for years.

NEW YORK
CHICAGO
SAN FRANCISCO
ST. PAUL
ST. LOUIS
ATLANTA

A Texaco Representative will gladly give you the details of cost-saving Texaco Rail Joint Lubrication – proved on leading railroads. Just call the nearest Railway Sales Office listed, or write:

The Texas Company, *Railway Sales Division*, 135 East 42nd Street, New York 17, N. Y.

2 Other Texaco Railway Cost-Savers

1. Texaco asphalt-cement pressure grouting, utilizing *Texaco No. 24 Emulsified Asphalt*, eliminates soft track, assures longer lasting stability.

2. *Texaco Asphalt* coating for stone ballast improves drainage, reduces fouling.

TEXACO

TEXACO Rail Joint Lubrication

TUNE IN . . . TEXACO presents MILTON BERLE on television every Tuesday night. METROPOLITAN OPERA radio broadcasts every Saturday afternoon.

SIMPLICITY for ease of operation

...with the safety of Certain operation

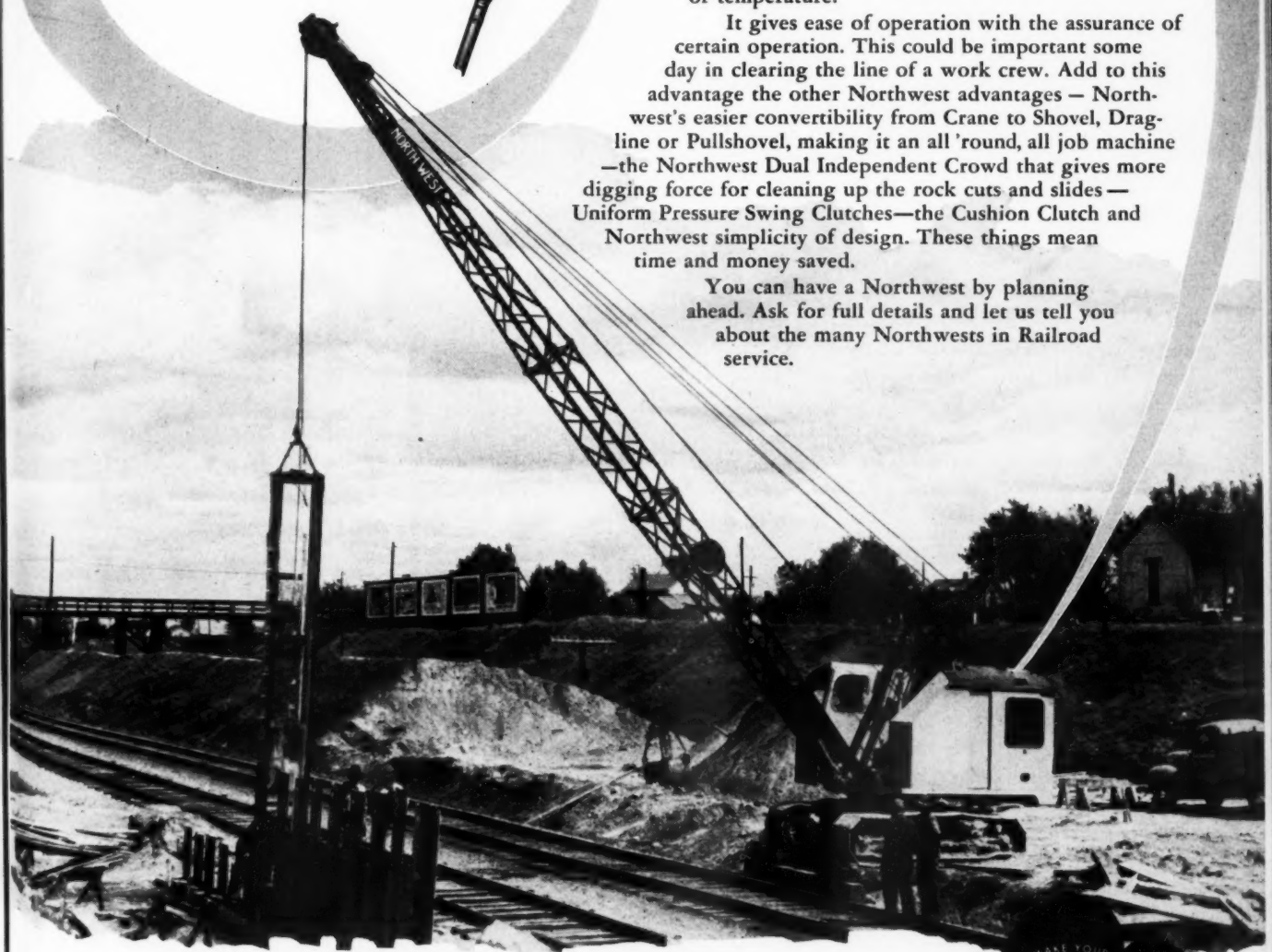
The "Feather-Touch" Clutch Control utilizes the power of the engine to throw heavy drum clutches. This is all there is to the device. Compare this with the complications being offered on other similar equipment.

WHEN your operators get on a Northwest out on the line you know it is going to work. Your Northwest will never be shut down because of control failure.

The "Feather-Touch" Clutch Control is a simple mechanical device—a drum, a band, and a toggle mechanism. No tubing winding around the machine, no valves, no pumps, nothing to fill, nothing to leak out, and it is unaffected by weather or temperature.

It gives ease of operation with the assurance of certain operation. This could be important some day in clearing the line of a work crew. Add to this advantage the other Northwest advantages — Northwest's easier convertibility from Crane to Shovel, Dragline or Pullshovel, making it an all 'round, all job machine —the Northwest Dual Independent Crowd that gives more digging force for cleaning up the rock cuts and slides — Uniform Pressure Swing Clutches—the Cushion Clutch and Northwest simplicity of design. These things mean time and money saved.

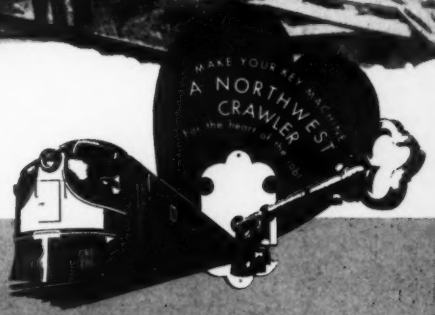
You can have a Northwest by planning ahead. Ask for full details and let us tell you about the many Northwests in Railroad service.



NORTHWEST ENGINEERING COMPANY
1513 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
SHOVEL • CRANE • DRAGLINE • PULLSHOVEL



"CAT" BULLDOZER...

Price of a standard "Caterpillar" D8 Tractor is $15,000; No. 8A Bulldozer, $2,345; No. 24 Cable Control, $750, f.o.b. Peoria. Prices subject to change without notice.

America's all-purpose tool!

WORKING near Wenatchee, Washington, for the Great Northern R.R., this "Caterpillar" powerhouse is moving riprap material from native deposit for stockpiling and loading on flat cars. It's a "Cat" D8 Tractor with No. 8A 'Dozer with cable control — and for dependable *big* power and long life under the toughest conditions, you can't beat this matched tool.

These machines give you *matched* design — tractor and 'dozer built to work together. This brawny team is a bear at meeting work schedules. Sturdy construction and quality materials enable it to keep punching full time without down-time, and the special steel cutting edge of the blade hammers through the toughest going. Most important of all, the precision methods used in "Caterpillar" factories build extra years of life into these highly maneuverable bulldozers.

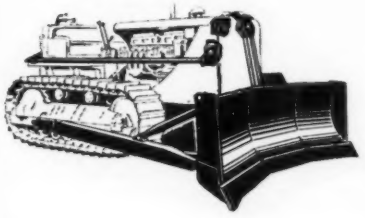
For help with your equipment problems, see your "Caterpillar" dealer *now*. Today's expanding military program has high priority. But it is recognized that our national preparedness depends upon stepped-up civilian production too. So your "Caterpillar" dealer is especially interested in meeting your needs — through equipment replacement and by exercising his working partnership with you to keep the machinery you have *on the job*.

CATERPILLAR, PEORIA, ILLINOIS

• • •

"CATERPILLAR" BULLDOZER EXTRA FEATURES

1. Tractor and 'dozer *broken to harness*, and a size for every need.
2. Moldboard curvature for active, *rolling*, higher production loads.
3. Box section side arms — extra thick at points of greatest stress.
4. Choice of straight or angling type of blade, simple to maneuver and easy to adjust or detach.
5. Your choice of hydraulic or cable control.
6. The power of the "Caterpillar" Diesel Engine is geared to blade *capacity*.



New Addition to 'Dozer Line

Here's a specialist that can step up production and cut costs. It's the brand new No. 8U 'Dozer for use with the "Caterpillar" D8 Tractor with cable control. Working best in loose or light material, the end portions of this blade extend forward to give it a flat U shape. This enables it to drift large loads without spillage, 'dozing longer distances for bigger production. The No. 8U is built to the same high standards of strength and long life as the other "Caterpillar" Bulldozers. The versatility of this new tool gives it excellent performance on all kinds of 'dozing jobs, from stockpiling to pioneering.

CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

Specify . . .

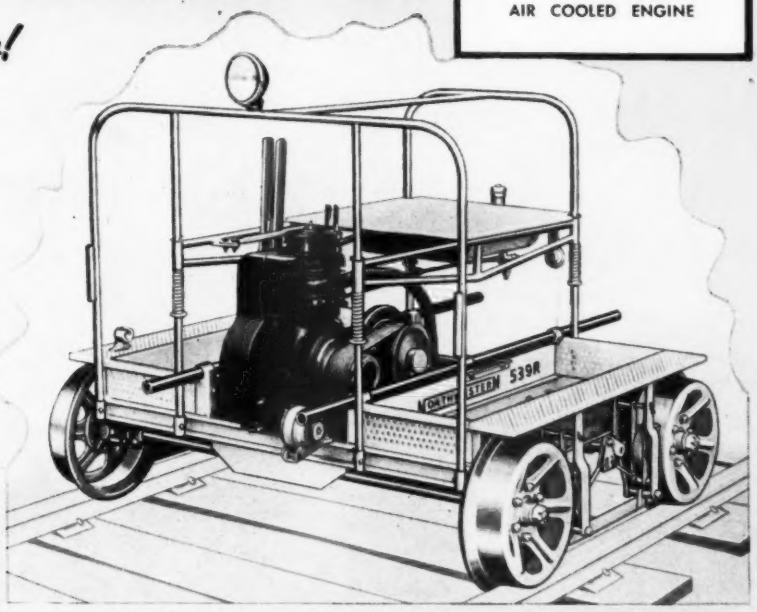
NORTHWESTERN

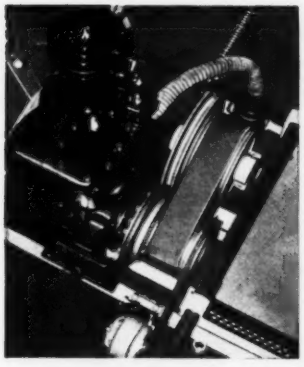
539R

POWERED BY
BRIGGS & STRATTON
MODEL 23B
8.25 H.P.
AIR COOLED ENGINE

Entirely new!

Never-reverse engine
No transmission
No clutch
Dependable reverse
Timken bearings
Spring suspended seat
Magnematic ignition
Chain drive





Departing from conventional motor car designs, Northwestern has perfected an entirely new type of motor car drive. Now you can have a light one or two-man inspection car with a reversing principle that needs no clutch, transmission or engine reversals. A simple belt and friction tilting countershaft does all the work. Pull the countershaft back and an endless belt tightens, providing forward motion through a chain drive. Push the countershaft forward and a V disc engages a friction ring which in turn reverses the countershaft and chain drive. Our authorized representatives will be glad to provide more information.

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P. O. Box 2029

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NORTHWESTERN MOTOR COMPANY

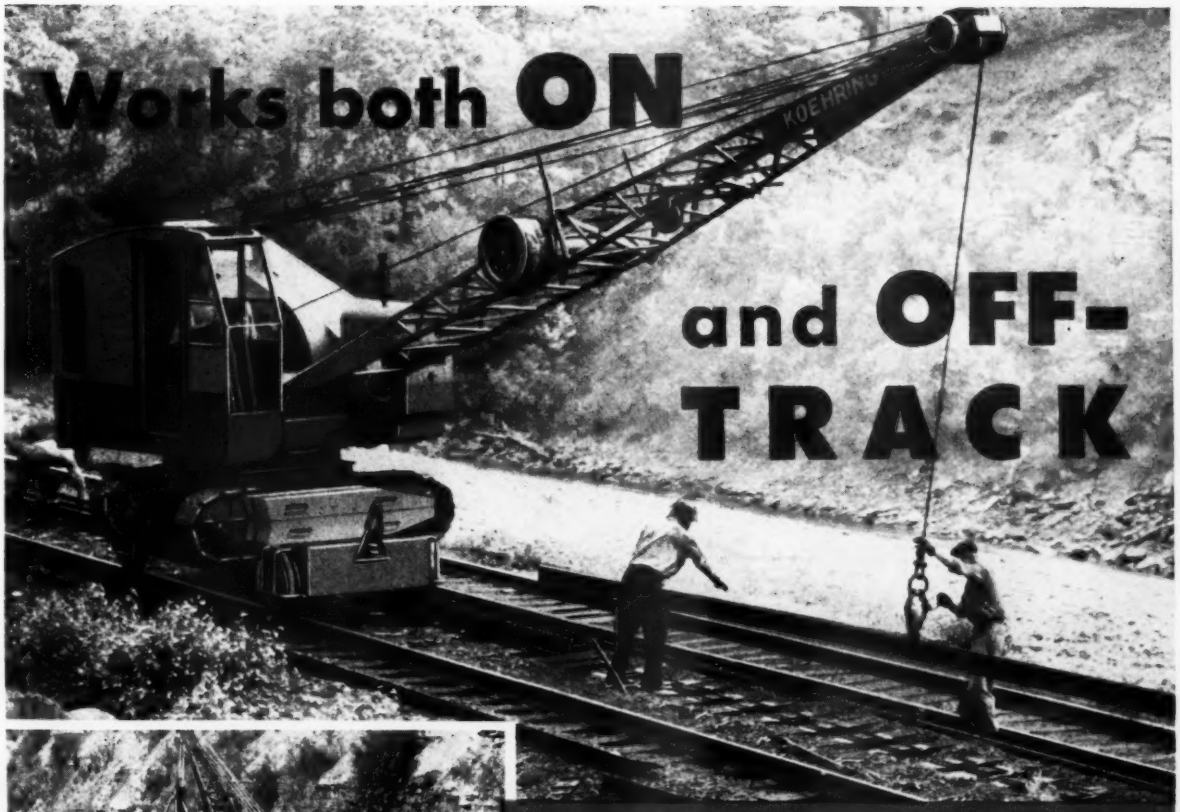
FACTORY AND GENERAL OFFICES: EAU CLAIRE, WIS., U. S. A.

THE UNIT RAIL ANCHOR

UNIT RAIL ANCHOR COMPANY, INC.

6301 BUTLER STREET PITTSBURGH 1, PENNSYLVANIA

Works both ON and OFF-TRACK



3 LARGER SIZE Koehring excavators have dipper capacities up to 2½ yards . . . lift capacities up to 79½ tons. Heavy-duty ¾-yard 304 (above) safely lifts from 13.9 to 25 tons, depending on crawler, rubber-tired cruiser or truck-type mounting.

SIMPLIFY TRACK-BED STABILIZATION —

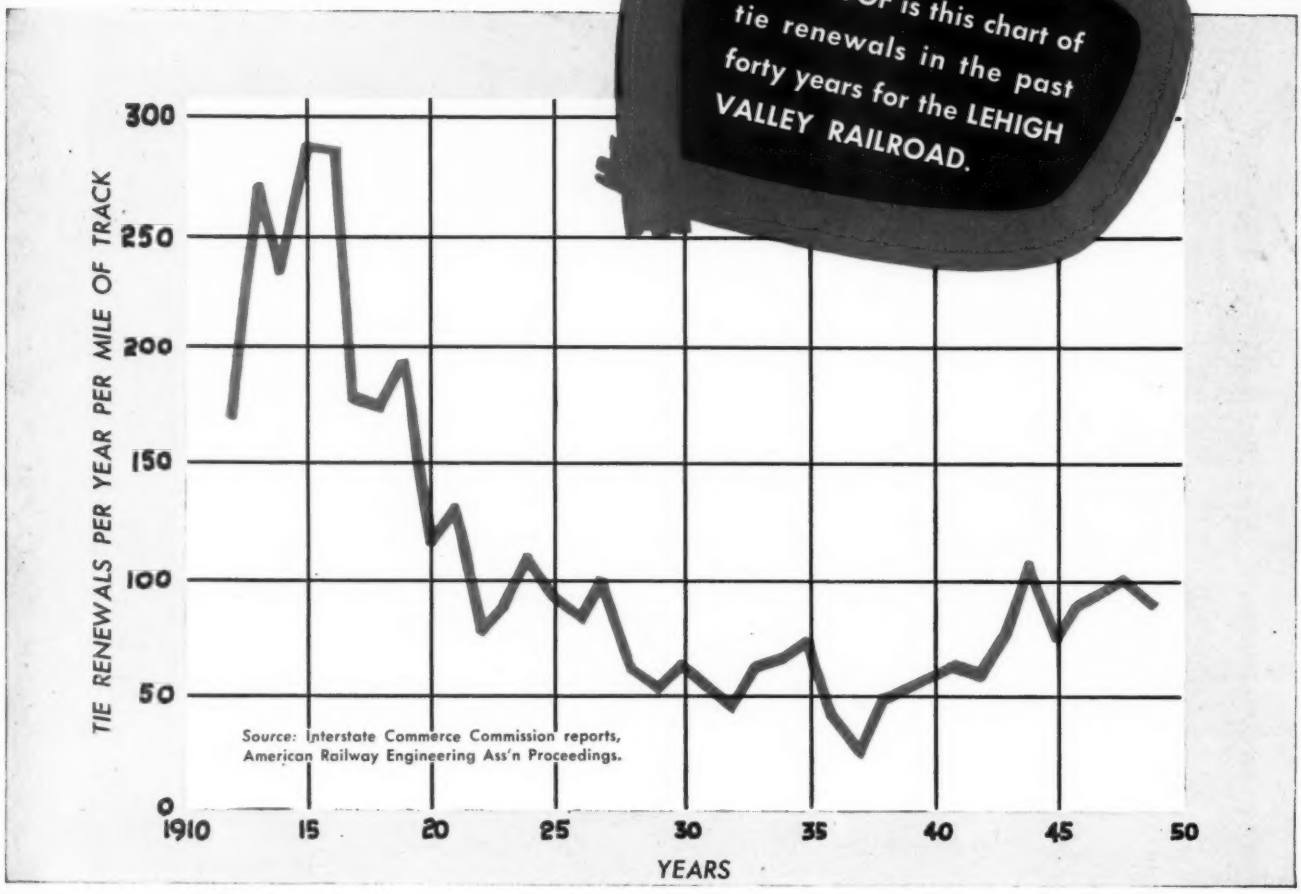
Water or ballast pockets in track sub-grade are easily corrected with Koehring Mud-Jack®. Injection points are driven below ballast . . . hydraulic pump forces soil-cement slurry into weakened area, stabilizes existing support material, leaves firm, lasting sub-grade. Slurry can be forced over 70 feet deep for stabilizing fills at trestle ends. There's no interference with rail traffic. You save on labor, cut maintenance costs, reduce "slow orders".

SELF-PROPELLED RAILAID

- Saves extra cost of separate on and off-track cranes . . . combines all the advantages of a self-propelled track crane with the versatility of a standard crawler crane.
- Powers its own rail-propulsion car.
- Travels at 4 rail speeds up to 14.4 m.p.h.
- Loads or unloads itself on ramp-equipped propulsion car in less than 10 minutes . . . sets the carrier on and off track.
- Crane lifts 6.6 tons from carrier . . . has 3¼-ton lift capacity on ground. Standard 30-foot boom extends to 50 feet.
- Readily converts to magnet crane, clamshell, dragline, pile driver, ½-yd. shovel or hoe.
- Get the complete RAILAID story from your Koehring distributor, or send for bulletin.

KOEHRING COMPANY
Milwaukee 16, Wisconsin

The Economy of AMCRECO LOWRY in the tie renewal



FROM 1915 on, annual cross tie renewals on the Lehigh Valley Railroad dropped from nearly 300 per track mile down to an average of approximately 80 for the years from 1922 to 1950!

This outstanding reduction in cross tie renewals was made in the face of the prevailing trend of much heavier loads, heavier traffic and higher speeds in these later years.

This record was made possible by one thing only: Amcreco preservative treatment of all cross ties. It is an example of the continuous effort on the part of American Railroads to effect operating economies and to contribute toward forest conservation.

CROSS TIES

BRIDGE TIES

AMCRECO CREOSOTED PRODUCTS

Pressure Treated by the Lowry Process for strength that lasts!

PILES

TIMBERS

PROCESS TREATMENT is proved again records of the Lehigh Valley Railroad

MORE PROOF is this test crib which has been exposed to the weather for over thirty-nine years.

- **These four ties were not treated**
- **The balance of these ties were treated by the AMCRECO LOWRY PROCESS**

The Amcreco Lowry Process Creosoted Cross Ties shown in the recent photograph at the right were taken from the first charge of ties treated for the New York Central Railroad and cribbed together in 1911 at the Amcreco plant in Rome, N. Y. Four untreated heart longleaf pine ties—then considered to be the longest lived ties available—were laid on top as indicated by the checks. The treated ties are still in perfect condition; the untreated ties failed long ago.

HEAVIER loads, greater traffic and higher speeds make the cost-cutting advantages of Amcreco Lowry Process Treatment more vital than ever before. Take the case the Lehigh Valley Railroad outlined on the opposite page and consider what the reduction in tie renewals means in the light of today's economic conditions. The record of the Lehigh Valley is not the exception, but is typical of records compiled by users of Amcreco Treatment.

The experience and facilities of the Amcreco organization are available to help all railroads secure maximum reduction in cross tie and timber replacements. Your inquiries are solicited.

AMERICAN CREOSOTING COMPANY
INCORPORATED

COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO

GEORGIA CREOSOTING COMPANY INCORPORATED

BROWNHOIST

builds better diesel electric locomotive-cranes . . .
only BROWNHOIST gives you all these features

NEW HOIST CLUTCHES. Roller-bearing mounted wide-faced drums. Air-operated cylinder, mounted within the drum itself . . . provides high line pull and easy adjustment.

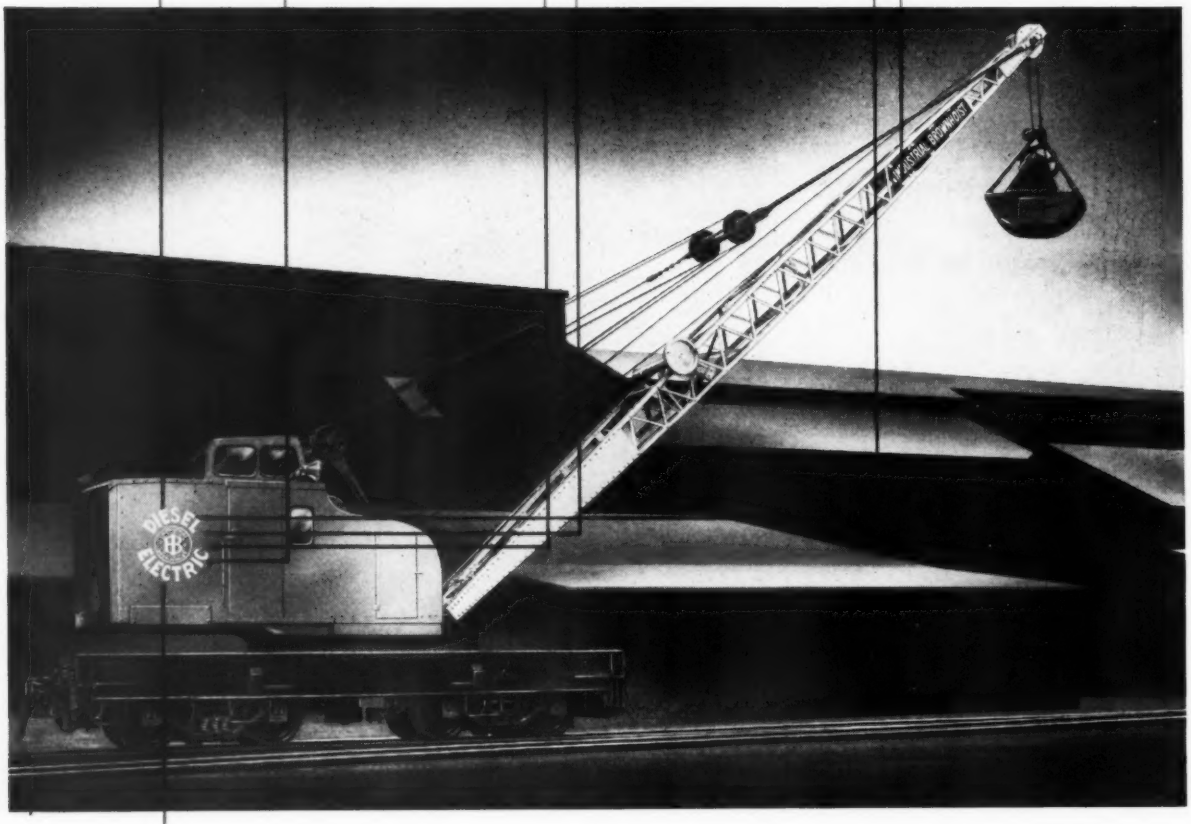
ELECTRIC ROTATION together with electric travel reduces maintenance to a minimum.

NEW FRICTION CLUTCH BOOM HOIST. Safe! Driven by worm and wheel enclosed in oil bath. Twin-barrelled, extra large diameter boom-hoist drums in full view of operator. Drums take all line in one layer which eliminates overlapping and fraying of rope.

DYNAMATIC CLUTCH between engine and crane machinery now standard equipment. Gives smooth, sensitive, 32 step control. Banishes slippage. Eliminates torsional impulse and vibration.

NEWLY DESIGNED, EXTRA HEAVY STREAMLINED CAB with controls functionally located for operating efficiency. All machinery guarded against weather, yet readily accessible.

NEW CLEAR-VISION BOOM provides maximum vision for greater working efficiency. This open type boom in conjunction with the Brownhoist patented Monitor-type cab guarantees 360° visibility.



BROWNHOIST

and these optional features—8 wheel chain drive for increased drawbar pull. Twin engine drive for work on extreme grades or where greater tractive effort is required. Timken roller bearing journals for low starting tractive effort. For complete description write to . . .

143

INDUSTRIAL BROWNHOIST CORPORATION, BAY CITY, MICHIGAN • **DISTRICT OFFICES:** New York, Philadelphia, Pittsburgh, Cleveland, San Francisco, Chicago, Canadian Brownhoist Ltd., Montreal, Quebec. **AGENCIES:** Detroit, Birmingham, Houston, Los Angeles.

The Bulldog Grip

● It is said that a bulldog's unshakable grip is due to a unique jawbone that locks when he has taken hold.

The powerful forged and tempered spring steel arm of a True Temper Rail Anchor takes hold with an equally unshakable grip when applied to a rail base—either new or worn. Yet the rail anchor is easily removed for re-application when desired.

True Temper's unequalled economies in application and durability make it first choice in maintaining thousands of miles of track.

Made and sold only by

TRUE TEMPER Corporation

RAILWAY APPLIANCE DIVISION
GENERAL OFFICES, CLEVELAND, OHIO
Factory: North Girard, Pa.

DISTRICT OFFICES:
2033 Daily News Building, Chicago, Illinois
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TRUE TEMPER

ALSO MAKERS OF TRUE TEMPER RAIL FORKS • RAIL JOINT SHIMS • BALLAST FORKS • TRACK SHOVELS • SCOOPS • SCUFFLE HOES • AXES • HAMMERS • HATCHETS • SCYTHES • WEED CUTTERS

Best watchman

ON 100 RAILROADS

From coast to coast, every hour of every day, Western's Model 10 Highway Crossing Signals are protecting lives and property.

- Model 10 eliminates the human element — human errors.
- Model 10 is completely and efficiently automatic— protects against second trains, too.
- Model 10 provides around-the-clock safety— in any kind of weather, under all temperature conditions.
- Model 10 is precision-built for reliability and economy—virtually no maintenance or replacement of parts.
- Model 10 is the result of half a century of specialized engineering in this field.
- Model 10, say traffic experts, is today's best buy in grade crossing protection.

Proved protection!

Here's just one "case history" from Model 10's unparalleled safety record. In June 1936 two Model 10 crossing signals were installed by the Grand Trunk Western Railroad in Harvey, Illinois. In the preceding 5 years there had been 14 deaths at this crossing. Since Model 10 installation there have been no accidents of any kind.

WESTERN RAILROAD SUPPLY COMPANY

2428 SOUTH ASHLAND • CHICAGO 8, ILL.

50 Years of Leadership

Railroad CONTRACTORS!

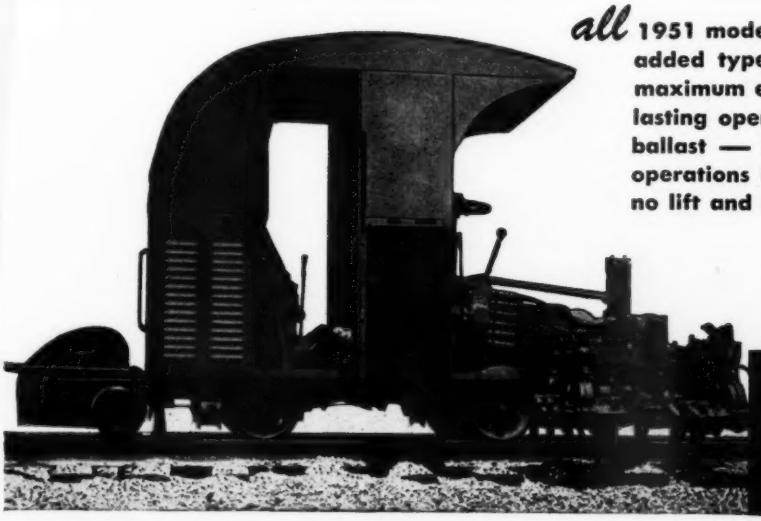
TO LAND THOSE BIG JOBS AHEAD, *and* DO THEM AT A PROFIT!

Investigate the

JACKSON MULTIPLE TIE TAMPER

It's the fastest, most economical and practical means of putting up track of finest quality and has definitely proved its ability to save its purchase price within a single season. One of the most successful Contracting firms in the country, now using six Jackson Multiples in its operations from Alaska to the Gulf of Mexico recently stated: ***"We are happy to be able to add to the number of Multiple Tampers which we have in use. We have found the machine to be far superior to any other type which we have been able to test."***

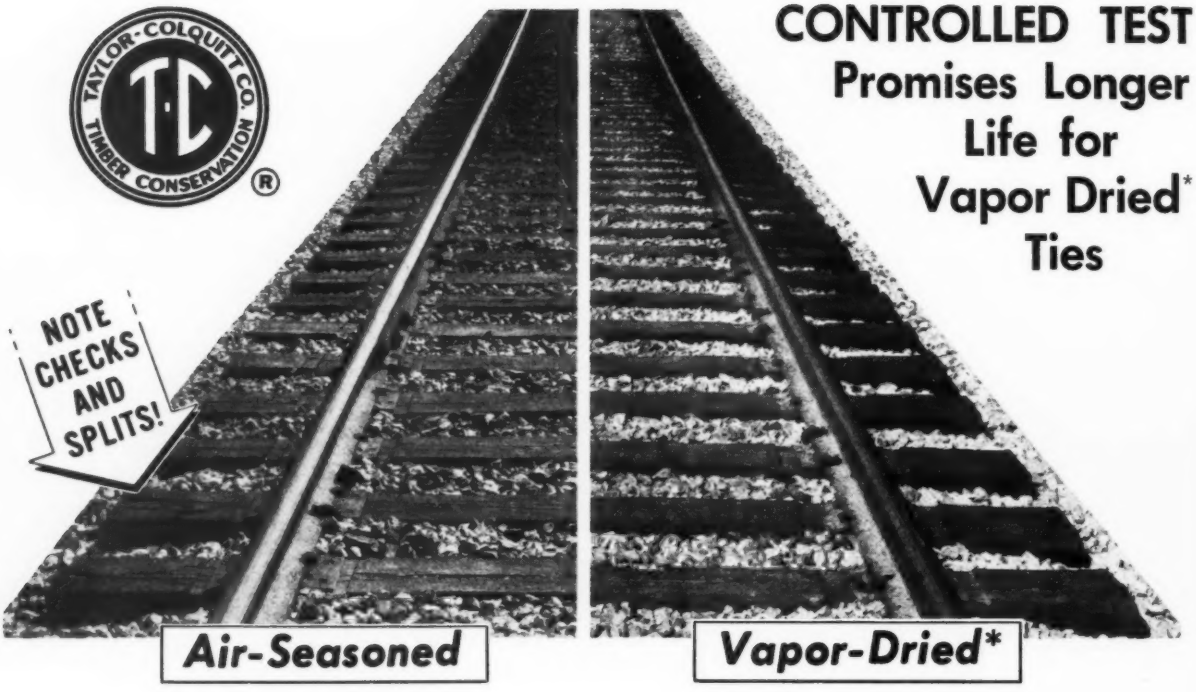
JACKSON Multiple Tampers are now used by more than 50 leading railroads and contractors. We will be glad to advise you of the nearest location where one may be seen in operation, or have one of our thoroughly practical field engineers discuss with you how these machines can help you land those big jobs and accomplish them at a profit in the face of what may be the greatest labor shortage in history. Write, wire or phone, today. Literature on request.



all **1951 models are now equipped with added types of blades and tips for maximum efficiency in all major ballasting operations — in all types of ballast — and for those smoothing operations in which there is little or no lift and no new ballast is spread.**

ELECTRIC TAMPER & EQUIPMENT CO.
LUDINGTON • MICHIGAN

CONTROLLED TEST Promises Longer Life for Vapor Dried* Ties



Which of these two pictures . . .

resembles 7-year ties in your track?

IN 1943, adjacent stretches of air-seasoned and Vapor-Dried ties were installed in the tracks of the Southern Railway near Spartanburg, S. C. Here, side-by-side, you can compare them after seven years service. All the ties are Red Oak and they all received comparable preservative treatment. But even imperfect pictures show the difference. An on-the-spot inspection would be even more convincing and indicate plainly which ties will probably be replaced first.

You couldn't ask for a more dramatic demonstration of the longer life of Vapor-Dried ties. Vapor-Dried ties last longer because they resist checking and splitting; because preservatives penetrate deeper. They save money, too, because insurance and interest charges are less when the long seasoning period is eliminated.

Don't delay longer; get information about Vapor-Drying today.

* Process patented

TAYLOR-COLQUITT CO.
SPARTANBURG, SOUTH CAROLINA

ENTERPRISE

Multi-Service

BALLAST CAR

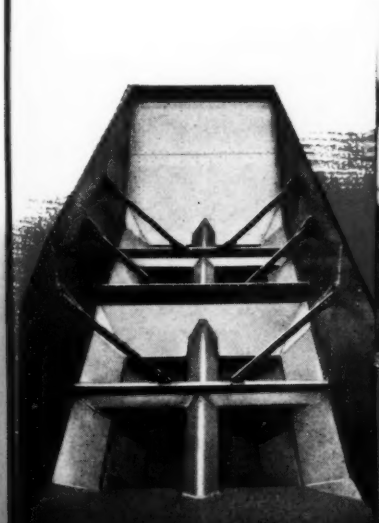
FOR BALLASTING OR COMMERCIAL SERVICE

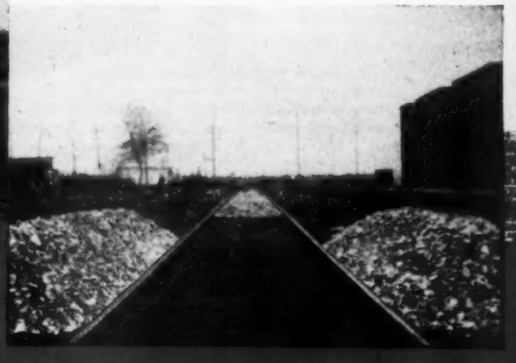
Deposits ballast in place and quantity desired.
100% discharge.
Easy, one-man operation.
All ballast deposited clear of rails.
Reduces time, labor, and cost of ballasting.

50-ton and 70-ton Enterprise Multi-Service Ballast Cars may be built by any car builder, the door operating mechanism being furnished by Enterprise Railway Equipment Company as a specialty.

ENTERPRISE RAILWAY EQUIPMENT COMPANY

59 East Van Buren Street • Chicago 5, Illinois



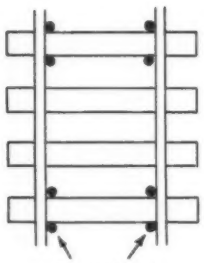


A Side Discharge Car
A Center Discharge Car
Operative Either or Both Sides Simultaneously

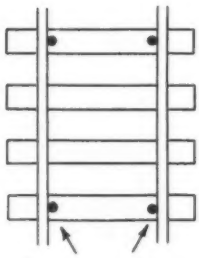
The Time to SAVE MONEY *on Your Track is when it is being* CONSTRUCTED!

In a Mile of Track there are:

- 133 Rail Lengths
- 3,192 Ties
- 6,384 Tie Plates
- 25,536 Track Spikes
- 4,256 Conventional Anchors



Conventional Anchors



One-piece 2-way Compression Anchor

Eliminate Maintenance . . Minimize material costs as outlined below . . .Yet double the lateral strength of your track.

By eliminating 4,256 spikes we save	$ 298.00
By eliminating driving cost of 4,256 spikes, we make a labor saving of	170.24
Saved per mile	468.24
Using Conventional Anchors to accomplish TWO WAY ANCHORAGE requires 4,256 anchors at a cost of	1,276.80
Using the NO-CREEP RAIL ANCHOR to accomplish TWO WAY ANCHORAGE requires 2,128 anchors at a cost of	638.40
In each case above, 8 ties are anchored TWO WAYS. Saved	638.40
Savings in materials and labor per mile of track — Saved on Anchors	638.40
Saved on Spiking	468.24
Saved per mile of track	1,106.64

THE GREATEST SAVING PER MILE OF TRACK IS IN MAINTENANCE

It costs about $0.04 each to knock off, reset and redrive an Anchor. There are 4,256 anchors in a mile of track.

Cost per mile of setting anchors 4,256 x $.04	$ 170.24
Most railroads program this operation twice a year—for summer and winter; so 2 x $170.24 gives cost per mile per year	340.48
Cost for 10 years, per mile	3,404.80
Cost for 100 miles, 10 years	340,480.00

All of this maintenance cost is ELIMINATED WITH THE NO-CREEP Rail Anchor

The combined savings in material, labor and maintenance, over a ten year period are impressive.

Amount of maintenance eliminated	$340,480.00
Amount of materials and labor eliminated	110,664.00
Total Savings—10 years, 100 miles	$451,144.00

The hold down part has been designed to fit in the spike hole on gauge end of plate to produce quality welds. Using the UNIONMELT automatic welding head we can now turn out as many as 2,500 welds per 8 hours per welding unit.

The

NO-CREEP

Rail Anchor

is the only fully self-compensating Anchor on the market: it compensates for all weather, TEMPERATURE and Traffic conditions, Continuously. It is self-adjusting; insert it and FORGET IT. Ask the Road Master.

Write for details.

Phone BALTIMORE 1700

G & H RAIL CONTROLS, INC.

1704-6 Baltimore Ave. Kansas City 8, Mo.

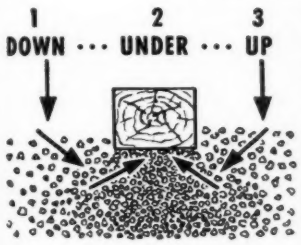
Chicago Representative: Gurley-Ortman Co. RR & Industrial Supplies, 332 So. Michigan Ave., Chicago, Ill.

Are you investing your dollars wisely ?

"Tamper Test" for Track-Maintenance Men

Here are questions that maintenance-of-way men are today asking about production tampers. And here are the answers, honestly set down as *we* see the facts.

Question No. 1

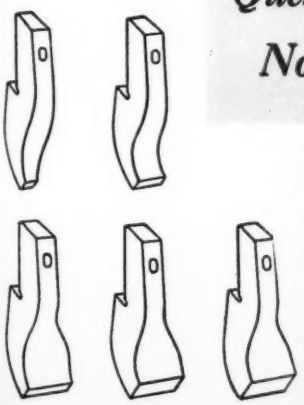


WHAT METHOD OF TAMPING IS MOST EFFICIENT?

a. Today's leading makes of production tampers *vary* in operating principles. One depends solely on a *vibrating* action. Another employs vibration plus a "squeeze" of the ballast by the tamping bars. A third adds only a partial squeeze to a direct, single, air-actuated force. But the Pullman-Standard Power Track Ballaster employs *triple action for full compaction.* An exclusive patented cam action and tamping bar design combine to direct the tamping force downward, *then inward and upward.* Thus, the ballast is not only forced *under* the tie, but *up against* the bottom of the tie, as shown in the diagram.

The Pullman-Standard Power Ballaster is the *only* triple-action (three-force) tamper available today to America's railroads.

Question No. 2



WHAT TAMPER WORKS WELL IN ALL TYPES OF BALLAST AND UNDER ANY RAISE SPECIFICATION?

a. The Power Ballaster has *proved* its ability to operate in *any type* and *size* of ballast. Also, it has proved its ability to tamp *any raise*—0 inch up to 8 inches—with equal efficiency and production quality. Different sizes of interchangeable tamping bars (as shown) and a simple drophead cam adjustment permit compacting any type of ballast . . . to any desired raise . . . and on any rail weight (60 lbs. to 155 lbs.).

With labor and ballast costs up, the Power Ballaster's *flexibility and dependability* of operation make it a sound investment for the future.

The Pullman-Standard Power Ballaster is the only *universal* production tamper available today to America's railroads.

over

Question No. 3

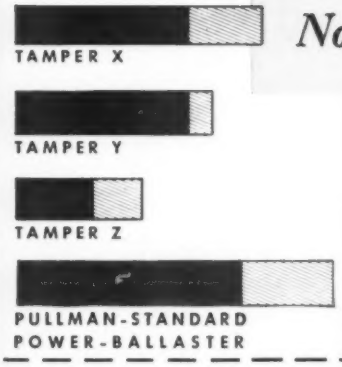
WHAT TAMPER PRODUCES THE BEST-QUALITY, LONGEST-LASTING TRACK?

a. Here's a typical example of the long-lasting qualities of Ballaster-tamped track. One of the heaviest-tonnage mainline tracks between New York and Chicago (1934 rail) was tamped in July, 1946, by one of the earliest postwar Power Ballasters. Not reworked since, today this track is still in good, usable condition for some of the nation's fastest, heaviest, and most frequent mainline freight, express, and passenger traffic. Recent inspection reports of this railroad's maintenance-of-way engineers regarding this track (see photo) prove that *four or more years of reliable track life* can be assured by proper use of the Power Ballaster. Secret of the Power Ballaster's ability to produce better, longer-lasting track: *Triple-action* compaction; *ample power* to meet varying ballast and raise conditions; and the *uniform* application of a three-force tamping action.

The Pullman-Standard Power Ballaster produces the best-quality, longest-lasting track tamping available today to America's railroads.

Question No. 4

WHAT TAMPER HAS THE HIGHEST PRODUCTION RATE?



a. According to our most reliable information, here are the hourly tamping production rates of other types of mechanical tampers: 350 to 500 feet; 350 to 400 feet; 150 to 250 feet. *On the other hand,* performance studies made during part of the 1950 work season on seven Power Ballasters operating under the variety of ballast and raise conditions of six different railroads *prove* that these seven Pullman-Standard Power Ballasters finished-tamped 318,377 track feet (60.3 miles) of track during the 590¼ hours of studied operation. *This is an average of 539.39 feet of finished-tamped track per operating hour per machine.* Sustained hourly averages of 450 to 650 feet for the Power Ballaster are normal production rates.

The Pullman-Standard Power Ballaster delivers *more production of quality track per hour* than any other tamper available today to America's railroads.

Question No. 5

WHAT TAMPER IS EASIEST AND MOST ECONOMICAL TO OPERATE?

a. Judge other tampers by these Power Ballaster features.

This machine is *completely self-propelled.* It has a running speed of 25 m.p.h. so that it can quickly reach work locations and rapidly run to sidings. Thus work delays due to train interruptions are reduced to a minimum. The set-off mechanism is self-powered and the unit can, therefore, be set off laterally in from 3 to 5 minutes.

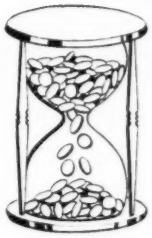
With only two levers to manage, the operator, seated directly above and in view of the tie to be tamped, can readily and easily keep the work moving smoothly, rapidly, efficiently. Unlike the operators of other production tampers, the operator of the Power Ballaster merely locates the machine over the tie and applies the predetermined number of strokes to the ballast. All the other phases of the triple-action compaction (for instance the amount and uniformity of applied force) are automatically controlled, thus minimizing the risk of man-caused production irregularities.

Competing production tampers, on the other hand, utilize 12, 2 or 4 independent power heads.

The Power Ballaster has many other exclusive design features to facilitate easy, dependable low-cost operation ... devices such as the automatic mechanism to feed ballast from the shoulder into the crib when needed and only when needed (thus eliminating at least two laborers required by other tampers under most operating conditions). It also has enough power to nip up loose ties (eliminating two more laborers required by other tampers when ties are loose).

The easily operated Pullman-Standard Power Ballaster produces finished-tamped track at the lowest cost of any tamper available today to America's railroads.

Question No. 6



WHAT TAMPER IS EASIEST TO MAINTAIN AND HAS A LONG AND USEFUL LIFE?

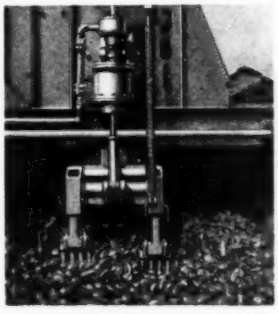
a. The tamper *we* can speak for is soundly engineered and ruggedly built . . . specifically designed to hold up *on the job* and to facilitate minor repairs and adjustments on location. Many impact-type ballasters sold to the railroads 15 to 18 years ago and even 24 years ago are still serving their purchasers. No other production tamper has ever equalled the Ballaster's long-life service on American railroads.

Backing the field performance of the Power Ballaster is a *training course* for the railroad's own personnel, to teach them correct operating procedures. And back of this effective training program are a *trained crew of factory service men and a complete stock of spare parts*—ready to meet any emergency, anywhere.

As materials and personnel become more difficult to obtain, the *value* of Pullman-Standard's training, spare parts stock and field services, as well as its known policies and organization, becomes more important.

Pullman-Standard backs the Power Ballaster with a most *complete and effective* customer service program.

Question No. 7



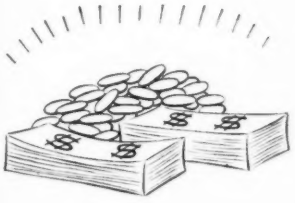
WHAT TAMPER IS ENGINEERED ON THE BASIS OF A CONTINUING, PROGRESSIVE, COMPLEMENTARY EQUIPMENT DESIGN?

a. Each work season, Pullman-Standard field studies check the performance of Power Ballasters operating under varying ballast and raise conditions. The data secured from these studies enable Pullman-Standard engineers to design improvements directed toward reducing maintenance and labor requirements and increasing the productive efficiency of the Power Ballaster's operation.

It is also a Pullman-Standard policy to engineer equipment improvements so that, when possible, they can be incorporated in previously built Power Ballaster units. For instance, the tamping strut, which transfers the weight of the machine entirely onto tamped track during the tamping operation, is not only a customer optional feature, but can be readily and economically added to all the Pullman-Standard Power Ballasters ever built. This same statement can be made for all other postwar Pullman-Standard Power Ballaster equipment improvements.

Pullman-Standard's progressive, complementary equipment engineering policy protects your Power Ballaster equipment investment and makes its usefulness long-lived.

Question No. 8



WHAT TAMPER PRODUCES QUALITY TRACK AT THE LOWEST COST?

a. We have been able to obtain a limited amount of data regarding the performance, maintenance, and labor and amortization requirements of competitive production tampers. In using these data, we have leaned backwards to favor the competing machines when comparing their production labor requirements and per-tamped-track-foot costs with those of the Power Ballaster. However, even if an hourly production rate of only 500 feet is used for the Power Ballaster (as compared with the 539.39-foot average established in Question No. 4), the substantial reduction in tamping costs obtained by railroads using the Power Ballaster is graphically illustrated in a chart which our representative will be glad to show you.

The Pullman-Standard Power Ballaster enables America's railroads to produce *quality* tamped track *at a lower per-track-foot cost* than any other available method.

over

Question No. 9

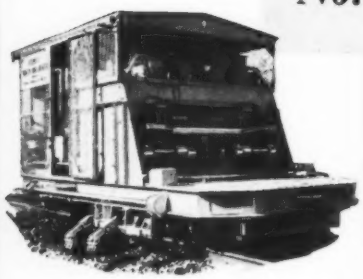
WHAT TAMPER GUARANTEE CAN NEVER BE DOUBTED?

a. Railroad men know what to expect from Pullman-Standard, a company that has been serving America's railroads *dependably* for more than 83 years. Most guarantees *read* alike..."against defects in design, materials, workmanship" and so on . . . but there is an *unwritten* Pullman-Standard guarantee that goes much further.

It might be expressed like this: "We guarantee this Power Ballaster, if properly used, to do a whale of a job for you. If it doesn't, we'll help you find the reason why . . . and *act accordingly!*"

Only Pullman-Standard's Power Ballaster is backed by a company which has reliably served America's railroads since 1867.

Question No. 10



WHAT TAMPER PAYS FOR ITSELF WHILE YOU USE IT?

a. Pullman-Standard has four plans and eight payment methods available, all designed to enable the railroads to obtain the Power Ballaster and meet the purchase or rental payments out of the savings accruing from its use. Consult your Power Ballaster representative to determine which plan and method best fits *your* operating requirements.

Summary:

Whether you select your tamper for its high production rate or its ability to produce quality, long-lasting tamped track, or its net low-cost operation, long-life usefulness, progressive engineering, or the manufacturer's reputation for effective customer service and reliable guarantees, the Pullman-Standard Power Ballaster is your best tamping equipment investment.

POWER BALLASTER PRODUCTS DIVISION

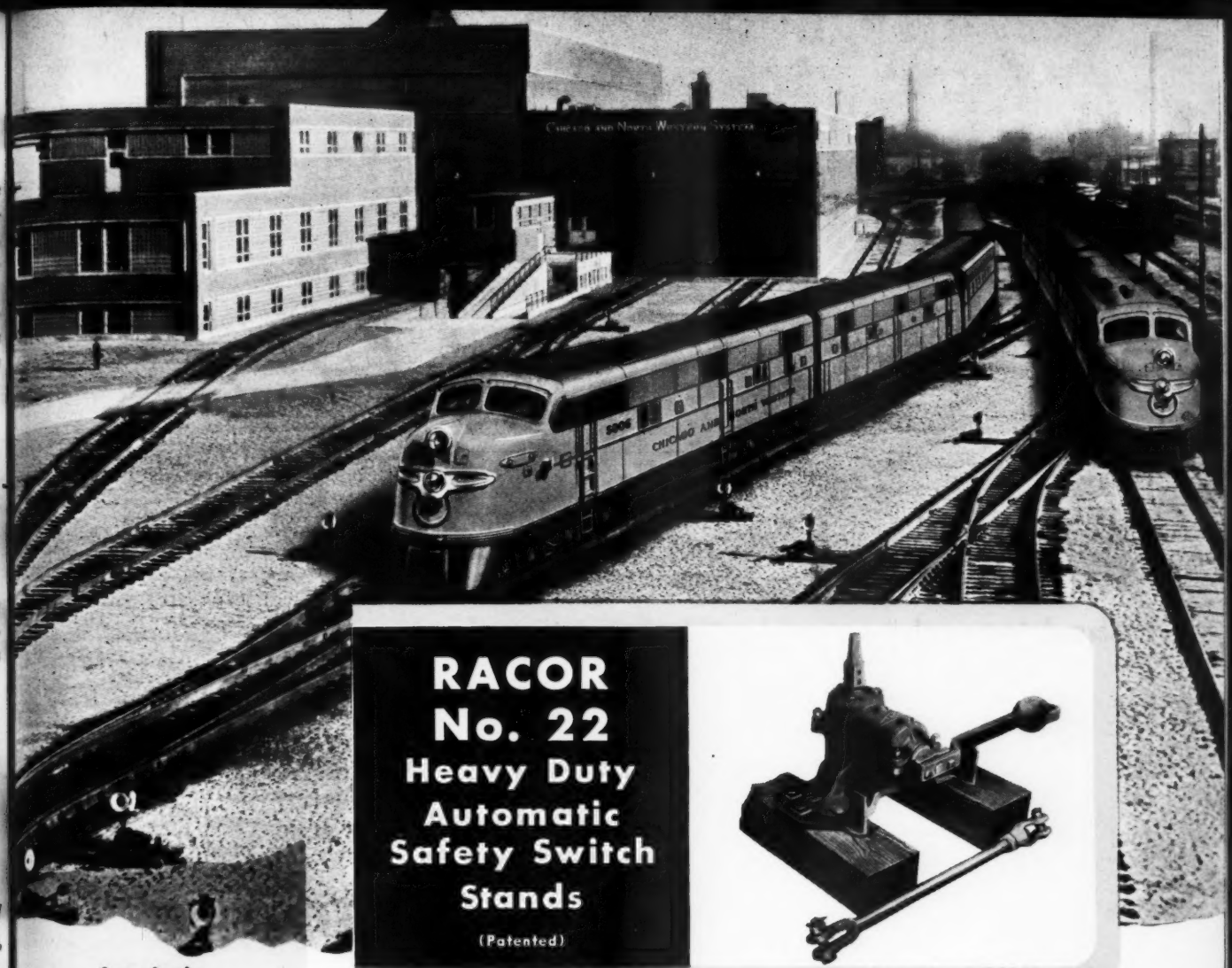
Pullman-Standard

CAR MANUFACTURING COMPANY

79 East Adams Street, Chicago 3, Illinois

BIRMINGHAM 3, 1004 First National Building • CLEVELAND 15, 907 Midland Building
NEW YORK 17, 52 Vanderbilt Avenue • PITTSBURGH 19, 1115 Gulf Building
WASHINGTON 6, D. C., 1025 Connecticut Ave., N. W.
SAN FRANCISCO 4, 2910 Russ Building

CANADA: The Holden Co., Ltd. • Montreal 3, 614 St. James St. W.
Toronto, 128 Simcoe St. • Winnipeg, 150 Princess St. • Vancouver, 769 Powell St.



RACOR No. 22 Heavy Duty Automatic Safety Switch Stands

(Patented)

Provide safety and economy on the Chicago and North Western Railway

Racor No. 22 Heavy Duty Automatic Safety Adjustable Switch Stands have been installed with the track facilities serving the North Western's new Chicago Diesel Shop. Recommended for all busy switching turnouts that are frequently run through, these stands operate either manually or automatically. Adjustment to fit slight variations in the throw of switches is provided by a heavy 1¾" diameter adjustable crank eye. Target and lamp rotate with switches whether thrown manually or automatically. During automatic operation the hand lever remains stationary. Write for descriptive literature.

RAMAPO'S GREATER EXPERIENCE AND FACILITIES ARE READY TO SERVE YOU

America's most complete line of track specialties

AUTOMATIC SWITCH STANDS

VERTICAL SWITCH RODS

SAMSON SWITCH POINTS

SWITCH POINT LOCKS

RAIL LUBRICATORS

ADJUSTABLE RAIL BRACES

DEPTH HARDENED CROSSINGS

REVERSIBLE MANGANESE STEEL CROSSINGS

MANGANESE STEEL GUARD RAILS

RACOR

AMERICAN Brake Shoe COMPANY

RAMAPO AJAX DIVISION

109 North Wabash Avenue, Chicago 2, Ill.

You can handle MORE jobs on a LOWER equipment

with the ALLIS-CHALMERS HD-5G TRACTOR

and interchangeable Tracto-Shovel attachments

This one versatile outfit cuts cost on all kinds of construction, maintenance and material handling—builds up shoulders—carries and places ties, rails and ballast — removes brush and cleans ditches — stores and compacts coal. These and dozens of other jobs are handled on a single, low investment for tractor and one or more specially designed attachments. Investigate further how the HD-5G and Tracto-Shovel will save money for you. Write for literature or see your Allis-Chalmers dealer.

THE MOST ADVANCED TRACTOR IN ITS POWER CLASS...

BIG WORK CAPACITY — This completely new smaller tractor has big tractor design, balance and stamina . . . surprises users everywhere with its performance. As owners say, "You've got to see it to believe it."

JUST THE RIGHT SIZE — to efficiently handle a wide variety of jobs. Has 11,250 lb. of properly balanced weight (tractor bare) . . . 40.26 drawbar hp. provided by the smooth-running, economical, 2-cycle GM Diesel engine — every down stroke a power stroke!

NEEDS LESS GREASING THAN AN AUTOMOBILE — Instead of hitting a dozen or more grease fittings every shift, you lubricate only one fitting every two weeks, two other fittings every five weeks (based on 40-hour weeks). *And you operate a full 1,000 hours* before replenishing lubricant in truck wheels, track idlers and support rollers.

SIMPLE TO SERVICE — All adjustments are unusually accessible. Major assemblies are removable without disturbing unrelated parts — engine, clutches, transmission, etc. There's less downtime — more time working . . . labor and repair costs are reduced.

BUILT-IN SAFETY AND CONVENIENCE — Easier steering and shifting with convenient controls, full vision. Cushioned seat, wide arm rests. Operator gets more done because it's easier to do more!

USEFUL TIP FOR BUILDING UP SHOULDERS

—Hydraulically controlled bucket tips forward . . . places dirt right where it is needed. HD-5G builds shoulders in two-thirds the time required by conventional 'dozers of equal size!

SOME OF THE MANY JOBS YOU CAN DO WITH THE HD-5 TRACTO...

Building and maintaining access roads

Stockpiling and reclaiming coal

Plowing or loading snow

Laying rails

14 TRACTO-SHOVEL ATTACHMENTS

that can be interchanged in but a few minutes

1 cu. yd. Standard Bucket

¾ cu. yd. Narrow Bucket

2 cu. yd. Light Materials Bucket

1 cu. yd. Rock Bucket

Teeth For All Buckets

Heavy-duty Bulldozer Blade

Heavy-duty Angledozer Blade

Lift Fork (4,000 lb. lifting capacity)

Crane Hook (5,000 lb. lifting capacity)

V-type Snowplow

Trench Hoe

Drag Bucket

Tine Fork

Rock Fork

The usefulness of the HD-5 Tractor is further widened by other Allied equipment: 2-wheel scrapers, dozers, rippers, rollers, cranes, winches and log carts.

handling ballast or other material

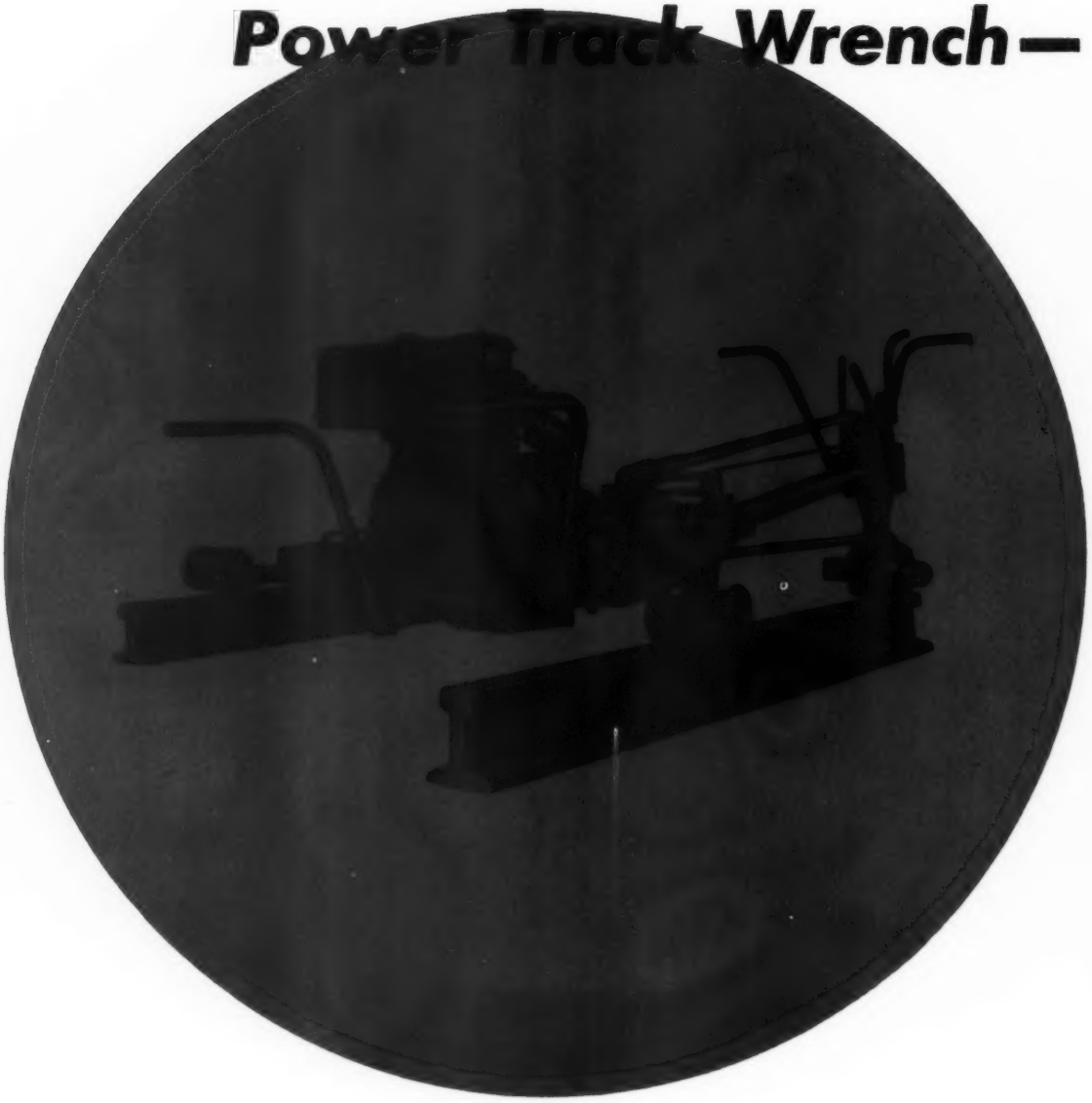
ALLIS-CHALMERS

TRACTOR DIVISION · MILWAUKEE 1 U.S.A.

for Greater Production...for Easier Operation...for Simplified Servicing

RACO Model C

Power Track Wrench—



Equally efficient with Vertical Chuck Unit for Screwspikes, Lag Screws, and Clip Bolt Nuts

For additional information, use postcard, pages 211-212

Soundly engineered; thoroughly "de-bugged" on 85 railroads.

For better track through uniform tightening of every bolt.

For frozen nuts — they MOVE or the bolt breaks!

Get the details from your sales engineer **RACO**

Railroad Accessories Corporation

RACO PRODUCTS R A ENGINEERED FOR LONG LIFE

405 LEXINGTON AVE. New York 17, N.Y.

Factories: Albany, New York; Woodside, New York

THIS DISASTROUS *Fire* COULD *have been* PREVENTED!

A buckled rail caused by the burning timbers below.

The LIBBEY-ZONE TREATMENT *would have saved this bridge!*

From main line to shunting trestle, every open-deck timber bridge presents its own fire hazard. Brake shoe sparks, lighted cigarettes tossed by careless smokers, drippings of molten metal from overheated shoes, oil, coal, and other fuel dropped from locomotive boxes . . . all these elements find a hungry target in unprotected surfaces where ordinary coatings have worn down and cracked to expose splintered wood.

Leading Railroads are now restricting fires with the LIBBEY-ZONE PROCESS* using Heavy-Duty Coating . . . the revolutionary scientific discovery that combines genuine Canadian ASBESTOS FIBRE with intensified elastic ASPHALT GUM to produce a LONG-LASTING, ECONOMICAL, GENUINELY FIRE-RETARDANT SURFACE for open-deck bridges and trestles.

"ZONE" HEAVY-DUTY COATING, when combined with the proper aggregate of crushed stone or gravel, expands with heat . . . yet does not melt; contracts with cold . . . yet does not flake! Laid thickly, the compound's resilient protective coating stretches over cracks and sinks into low spots, yet maintains an even spread and holds aggregate firmly in place when cold. "ZONE" HEAVY-DUTY COATING is easily and quickly applied and has nationwide distribution. Investigate the money-saving advantage of "ZONE" HEAVY-DUTY COATING.

Write for complete information to . . .

**Names of Railroads upon application*

THE ZONE COMPANY

A Division of the Southwestern Petroleum Company, Fort Worth 1, Texas

Reliable Herbicides for—

ROADBED and RIGHT-OF-WAY
FROM RECOGNIZED RESEARCH

We Recommend—

TCA-Chlorate — for BERMUDA GRASS, and where weeds and other grasses grow together.

Chlorate-Chloride — for JOHNSON GRASS, and where weeds and other grasses grow together.

Sodium-Arsenite — for general use on all annuals where poisonous chemicals can be applied.

TCA-Arsenite — for BERMUDA GRASS, and other vegetation growing together where poisonous materials can be applied.

Brush Killer — for most weeds, seedlings, and other brush in general application to the entire right-of-way.

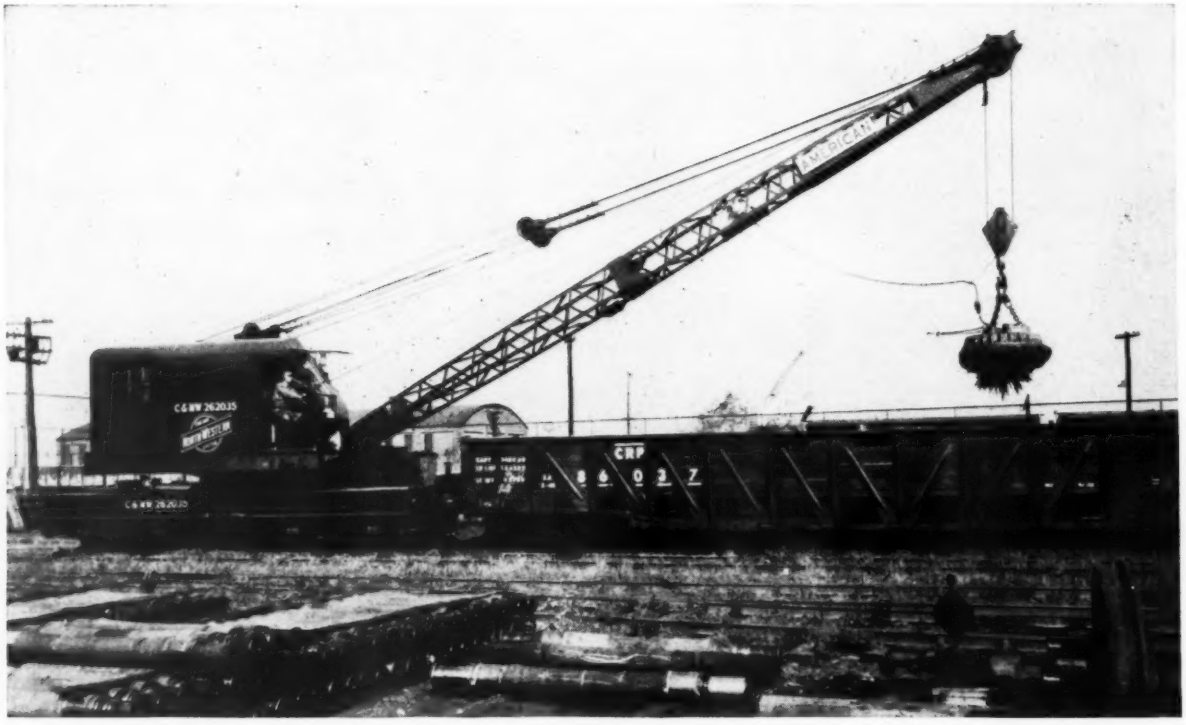
—::—

Complete Weed Killer Service

The R. H. BOGLE COMPANY

ATLANTA, GA. ALEXANDRIA, VIRGINIA MEMPHIS, TENN.

Saves 79% on fuel



FUEL cost for this 30-ton American Diesel crane averages about $1.40 a day. The steam crane it replaced used $6.60 worth of coal a day. For the Chicago & North Western Ry., that's a mighty important yearly saving—*on fuel alone.*

But that isn't all. Higher speed enables the American Diesel to load two more cars of scrap a day than the steamer ever could. And it saves three stops the steam crane made each day for fuel and water.

If you have ancient steam cranes eating up your profits, why not check and mail the coupon below.

Mail this coupon

Modernize...economize...with

American Hoist
& Derrick Company
ST. PAUL 1, MINNESOTA

31

American Hoist & Derrick Co. 1601-R
St. Paul 1, Minnesota

● Please send literature on
AMERICAN LOCOMOTIVE CRANES

Capacity_____ ☐ Diesel ☐ DiesELectric

Name_____

Company_____

Address_____

City_____ State_____

for lower cost

Building up a worn switch point in traffic.

. . . restoring battered rail ends
. . . building up worn frogs and switch points
. . . reconditioning crossings

—use AIRCO TIME-PROVED METHODS

Battered rail ends, worn frogs and switch points are quickly rebuilt with the Airco No. 800 welding torch – then heat treated with the same torch for longer life. These operations may be done either in the shop, or in track . . . and are but two of the many ways the versatile "800" is helping railroad men cut maintenance costs.

Yes, Airco time-proved oxyacetylene methods, using the "800" torch are ideal for maintenance-of-way operations. Why? Because wide selection of tip assemblies that are available for the "800" make it suitable for welding, flame cleaning, flame shrinking eye bars, and building up wheel burns as shown here.

Furthermore, with the addition of a cutting attachment, the Airco "800" can be easily converted to handle cutting jobs from thin sheet up to 6″ plate.

In addition to this wide operating range, other features of the "800" are: better flame control . . . perfect balance . . . and low maintenance cost.

For more information about this exceptional welding and cutting torch, as well as building up rail ends, hard-facing, flame cleaning or any other process in which Airco can help you, call or write your nearby Airco office, today.

Welding wheel burns with Airco RR rod.

Flame cleaning bridge structure.

Flame shrinking eye bars.

Costs Come Down Under the Airco Plan

AIRCO

AIR REDUCTION

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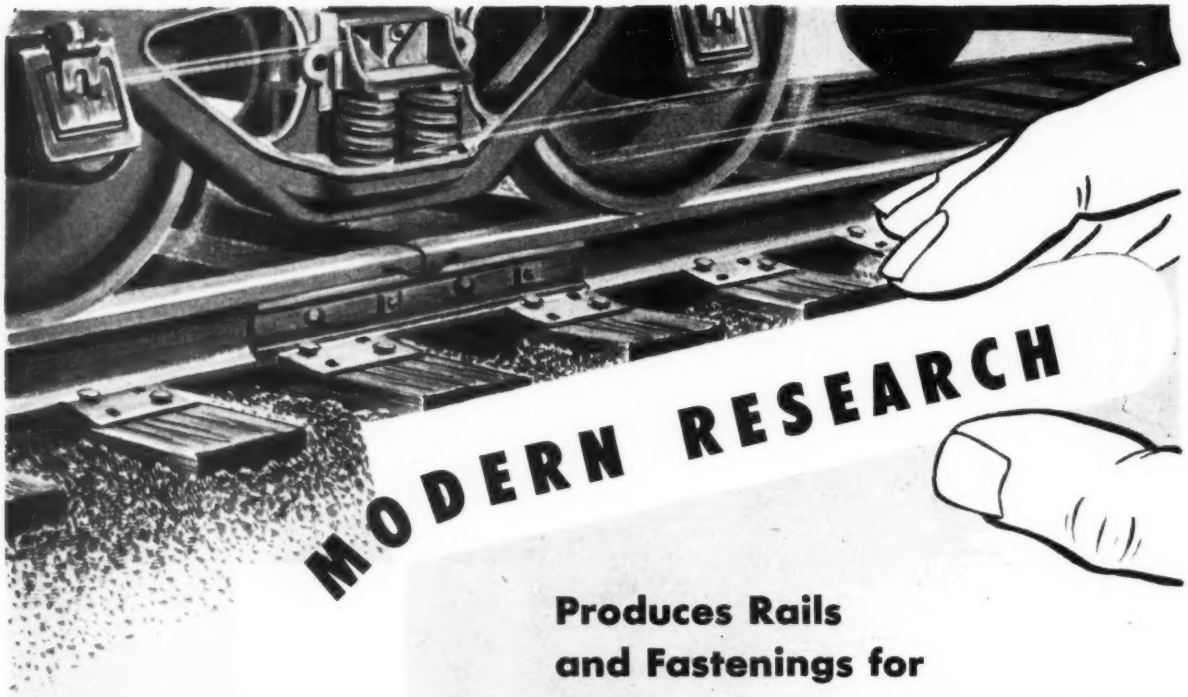
AIR REDUCTION PACIFIC COMPANY
REPRESENTED INTERNATIONALLY BY AIRCO COMPANY INTERNATIONAL
Divisions of Air Reduction Company, Incorporated

Offices in Principal Cities



MODERN RESEARCH

Produces Rails and Fastenings for

HIGH SPEED TRACK

...Basis of Modern Transportation

American railroads are pledged to ever better transportation. CF&I has pledged full cooperation in production of the rails for high speed track.

The Colorado Fuel and Iron Corporation
Denver

PRODUCTS OF CF&I

CF&I RAILS AND FASTENINGS

Cleans ballast in half the time on TIMKEN® bearings

THIS new Pullman-Standard Power Ballast Cleaner picks up both the shoulder and the crib ballast (where the track has been cribbed in advance), from either or both sides of the track simultaneously. It then screens and cleans the ballast and returns it to the track, distributed as desired at a rate of approximately 1000 feet per hour—twice as fast as former models! To help it do a quick, thorough job, the Pullman-Standard Car Manufacturing Company has mounted vital parts on Timken® tapered roller bearings.

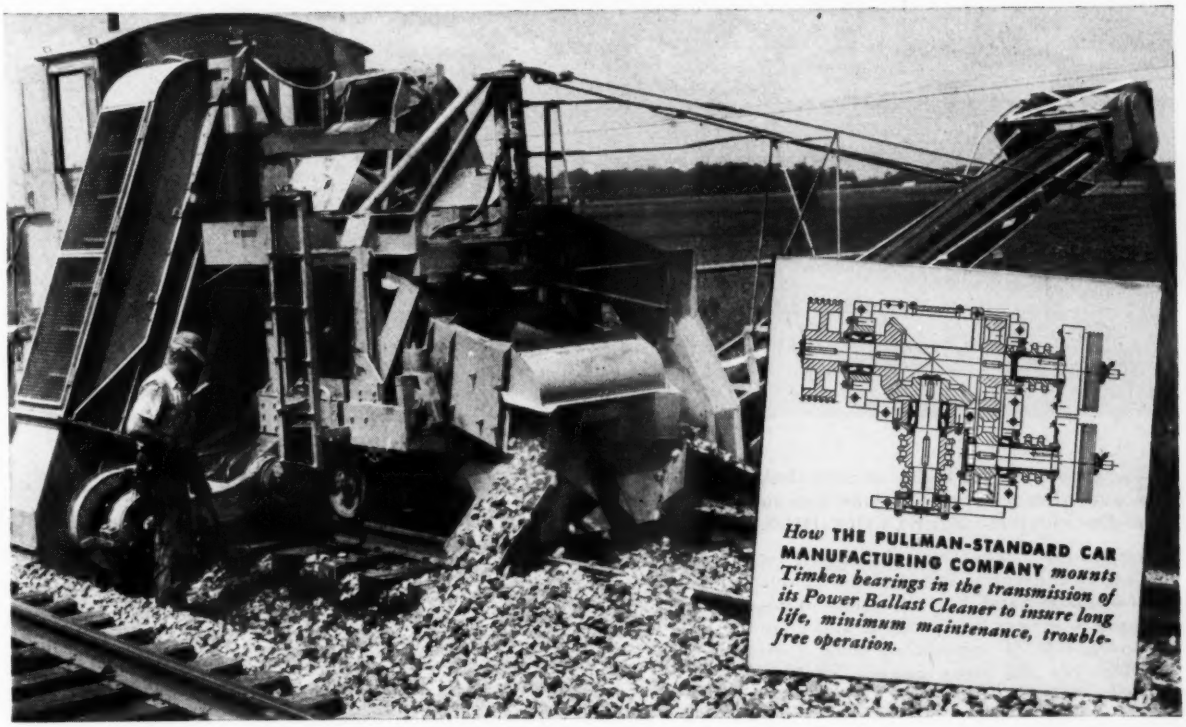
Timken bearings are used in the "Giant-Paw" eccentric assembly, the digger assembly, the transmission, and on the front and rear axles. These Timken bearings assure minimum maintenance, trouble-free service and long life for this new ballast cleaner. And with Timken bearings to keep it in top operating condition, track maintenance crews can be sure the ballast cleaner is ready for work whenever it's needed.

Timken bearings hold shafts in rigid, positive alignment. Excessive wear on moving parts is eliminated. Because of their tapered construction, Timken bearings can take any combination of radial and thrust loads. Line contact between rollers and races gives extra load-carrying capacity. True rolling motion and an incredibly smooth surface finish assure virtually friction-free operation.

Tight lubricant-retaining closures keep damaging dirt and moisture out —keep the lubricant in. Costly delays for maintenance and lubrication are cut to a minimum. Made of Timken fine alloy steel, Timken bearings are case-hardened to provide a hard, wear resistant surface and a tough, shock-resistant inner core.

Over 50 years of bearing research and development have gone into Timken tapered roller bearings. Throughout industry they are No. 1 choice. To get *all* the advantages that only Timken bearings can give, insist on bearings with the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.



How **THE PULLMAN-STANDARD CAR MANUFACTURING COMPANY** *mounts Timken bearings in the transmission of its Power Ballast Cleaner to insure long life, minimum maintenance, trouble-free operation.*

IT'S TIMKEN BEARINGS FOR VALUE!

To get the best value in bearings you may find this simple formula helpful:

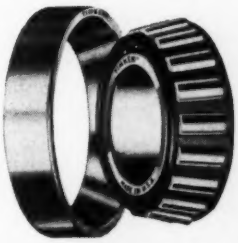
$$Value = \frac{quality + service + public\ acceptance}{price}$$

Obviously a big advantage *above* the line gives you more value than a small one *below*. No other bearing can match the uniform high quality, engineering and field service and overwhelming public acceptance you get with Timken bearings.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←

Pittsburgh STATIONHIDE

GIVES STATIONS NEW BEAUTY THAT LASTS LONGER!

MATCH the modern beauty of trim, sleek streamliners by bringing your stations up-to-date with Pittsburgh STATIONHIDE.

By using color arrangements that emphasize the best architectural features and subdue awkward angles and lines, these stations can be made to appear lower, neater and more attractive. Use of appropriate color combinations can also make interiors brighter, cheerier and more comfortable.

Pittsburgh offers STATIONHIDE in a variety of modern colors for inside and outside use. STATIONHIDE for exteriors is a scientifically prepared finish, custom-made for the job of beautifying and protecting railway stations. It brushes or sprays easily, dries to a tough, elastic coating which will not discolor or darken from coal smoke or industrial fumes and will stand up under severe climatic conditions.

Interior STATIONHIDE for walls and trim is an economical, durable finish in a variety of colors which will withstand the hardest kind of wear.

Call on us for expert advice. Our wide experience in the field of railway finishes often can save you time and money.

• • •

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Industrial Paint Division, Pittsburgh, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio.

Write for this FREE Booklet!
Contains Pittsburgh's complete line of Railway Structural Maintenance Finishes with many practical suggestions for their efficient and economical use.

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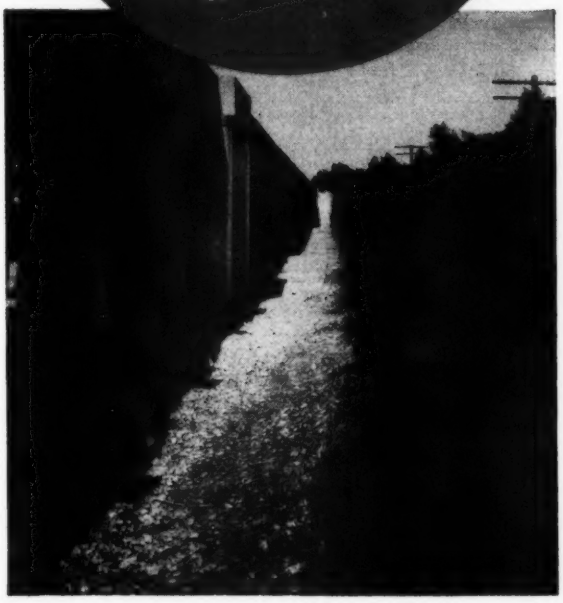
It costs less

to keep out unwanted growth with Chapman Chemicals



WHAT'S YOUR PROBLEM?

■ New chemical developments make it possible for railroads to maintain a clear right-of-way and clean track-ballast and trestle areas with less labor and at far less cost than by methods formerly used.

For clean track ballast area, spray with Sodium TCA. It kills foliage and roots of such perennials as Johnson, Bermuda, Quack, and Blue grasses. In areas where only control of grass foliage is desired, use Penta Weed Killer . . . the cheapest and most effective contact herbicide.

For clear right-of-way, use Chapman Brush Killer. It effectively controls weeds, vines, brambles, and other woody growth, without killing grasses.

For bare ground under trestles, use Borascu to sterilize the soil and stop all growth. It is non-poisonous and non-combustible. One application may last two years or longer.

The great variety of plant life, climatic conditions and soil types make it impossible to offer any one chemical prescription for all weed killing problems. We will be glad to give you recommendations applying to your problems.

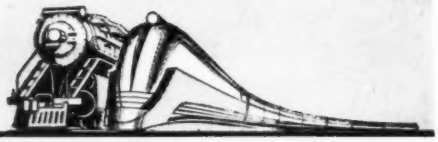
CHAPMAN CHEMICAL COMPANY
Dermon Building, Memphis 3, Tenn.

CHAPMAN®

Weed Killers

SODIUM TCA • CHAPMAN BRUSH KILLER • PENTA GENERAL WEED KILLER • BORASCU

"Shop and Track Talk"



Published by OXWELD RAILROAD SERVICE DIVISION, Union Carbide and Carbon Corporation

Costly Diesel Parts Saved from Scrap Heap

When hard-to-weld diesel parts become badly worn they're usually scrapped. But not in this shop! Most of the worn or damaged parts are quickly returned to service—thanks to HELIARC welding. Aluminum, cast iron, and stainless steel parts are all welded with excellent results.

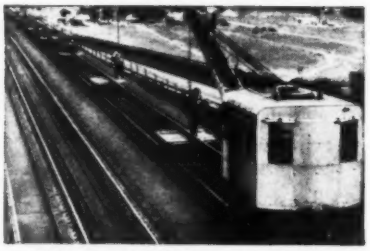
Cast iron cylinder heads are welded in compact, heat-retaining boxes. While the box holds the heat, the operator repairs any cracks and rebuilds worn valve seats. Minimum finishing is required because no flux is needed to produce clean, smooth welds with a HELIARC torch.

Building up a worn valve seat in a cast iron cylinder head.

The shop repairs everything from huge gear-box casings to small castings — even high-alloy valves are reclaimed. Recently, a badly smashed Everdur condenser tank was salvaged. Thirty-three lineal feet of HELIARC welding put the tank back in service.

Same Rail, Same Track, But No Clickety-Clack

Here's a railroad that replaced 9 miles of jointed standard track and only purchased 400 tons of new 110 lb. rail. The new rail was welded and laid in track. The old rail released was sorted and curve-worn rail discarded. The balance was cropped and welded into 1326 ft. lengths, then put right back in the same track. This procedure was continued until the job was completed.

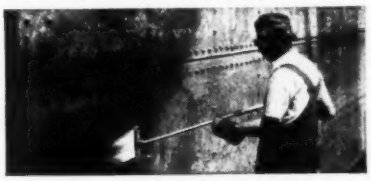


"Ribbonrail" 1326 ft. long being hauled on push cars.

That's how "Ribbonrail" was produced for the Huey Long Bridge across the Mississippi. About seven miles of old rail was re-used. The old rail—in the same track—now provides a smooth-riding surface. Harmful bridge vibrations caused by wheels hitting conventional joints are now eliminated. But more important, joint bars and bolts—the starting points of corrosion—are gone. Easy-to-maintain "Ribbonrail" on this important bridge will cut costs as well as provide smooth, quiet riding.

A Hot Brush

A brush of oxy-acetylene flames prepares a steel bridge for repainting. Paint applied to the warm, clean, dry surface spreads easily, goes on smoothly, and bonds tightly.



Paint lasts longer after this treatment.

P.S. If you'd like to know more about any of these jobs, write to OXWELD. *We'll be glad to send you further information.*

What's News?

► The problem of economical cleaning of car axles prior to magnetic testing has been solved. One oxy-acetylene flame-cleaning unit helps remove scale from 60 axles daily.

► Welded rail for the Cascade and Moffat tunnels received an important treatment to make it last longer -- every foot was oxy-acetylene flame-cleaned prior to the application of a corrosion-resistant coating.

► By reclaiming damaged machines and worn equipment one railroad claims a savings of $22,500 per year. They make the repairs with HELIARC inert-gas shielded-arc welding.

► Light, easy-to-move baffle boxes for rail end-hardening are being used by many leading railroads. With one baffle box, a two-man crew can flame-harden about 400 joints a day. An oxy-acetylene flame quickly produces the desired hardness and pattern on the rail end surfaces.

OXWELD RAILROAD SERVICE DIVISION

Union Carbide and Carbon Corporation

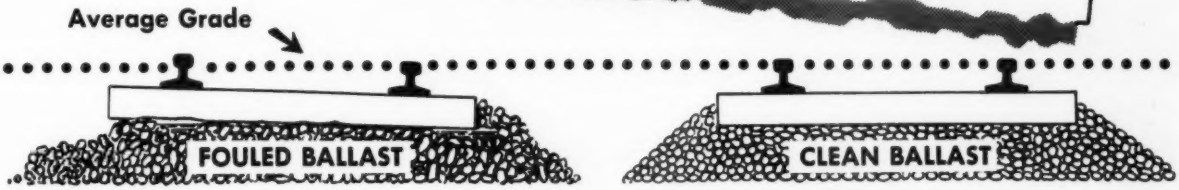
Carbide and Carbon Building UCC Chicago and New York

The terms "Heliarc," "Ribbonrail," and "Oxweld" are trade-marks of Union Carbide and Carbon Corporation or its Units.

Hold Grade Levels

Yet put up to 18" of CLEAN BALLAST UNDER TIES

Matisa Ballast Cleaner is the ONLY machine capable of thoroughly cleaning ALL BALLAST—beneath ties as well as in cribs. Note that digging teeth pass clear under ties and rails, doing a COMPLETE job.



BEFORE *Matisa* CLEANING

AFTER *Matisa* CLEANING

Whether to hold grade levels on dirty ballast, or provide a clean ballast cushion with a grade raise has long been a major maintenance of way headache. Now, with the Matisa Ballast Cleaner, you can hold the grade level (or *lower* it), yet put as much as eighteen inches of thoroughly cleaned ballast under ties!

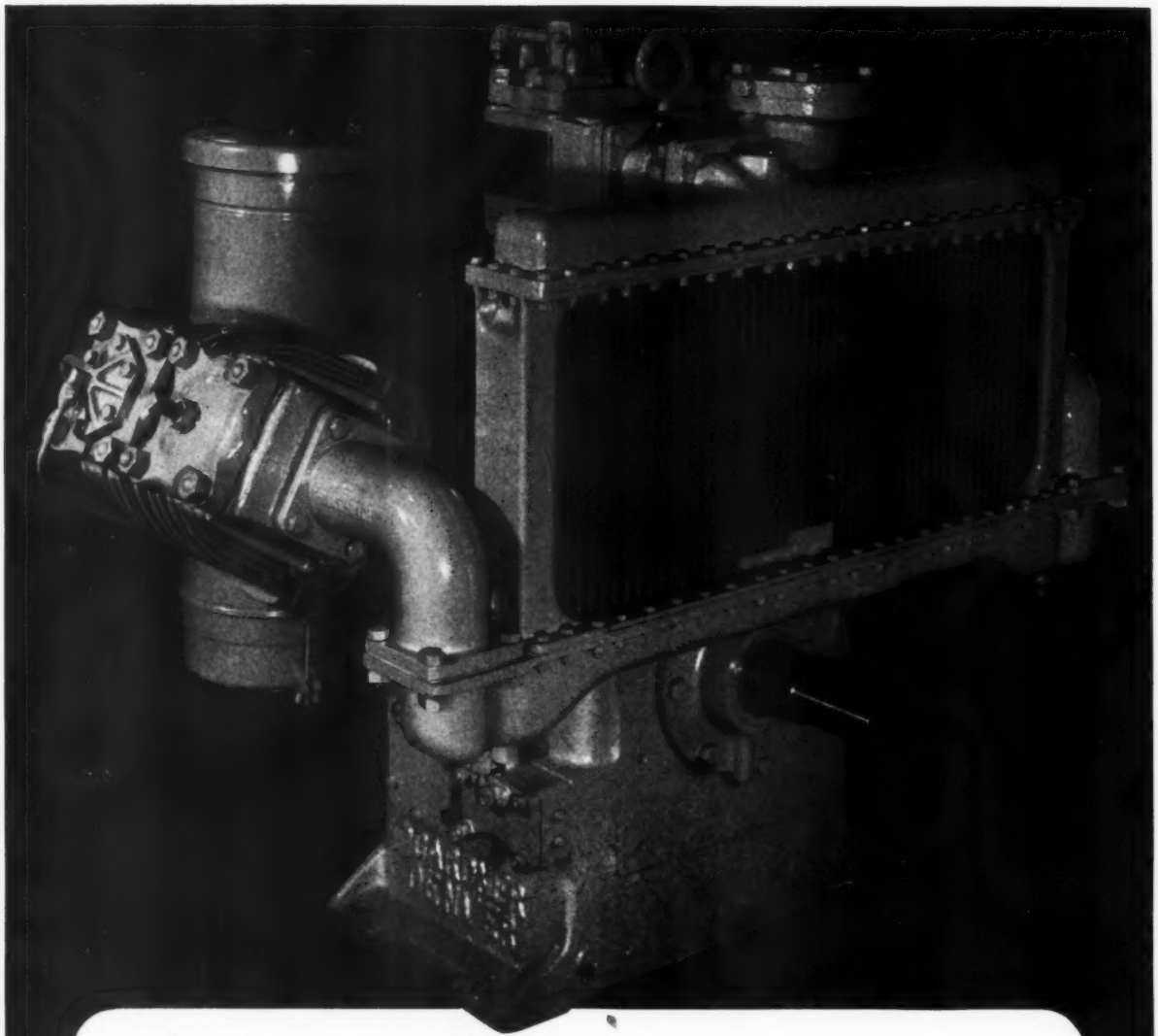
Matisa cleaning—and *only* Matisa—solves the common grade problems at crossings, underpasses and in yards... And used with the Matisa Tamper, produces roadbed that is *better than new-laid track* put down with other ballasting methods.

Matisa Ballast Cleaners are furnished on a supervised rental basis for cleaning 1,000 feet or 1,000 miles of your track . . . rapidly, efficiently and *completely.* Write our M. W. Engineering Department for details on 1951 Cleaner availability.

THE MATISA EQUIPMENT CORP.

224 South Michigan Blvd. • Chicago 4, Illinois

ALL OVER THE WORLD ***Matisa*** TRACKWORK SPECIALISTS



why it pays railroaders to insist on GARDNER-DENVER QUALITY

An outstanding compressor for railway service, the Gardner-Denver WX is backed by more than 90 years of manufacturing experience. Built to rigid quality standards, the WX assures:

High availability—thoroughly dependable . . . always ready to deliver full capacity when you need it.

Smooth running—accurately balanced construction . . . eliminates vibration and simplifies mounting.

Easily accessible—for speedy routine inspections and minor adjustments.

Sustained efficiency—stays high at any altitude . . . assures years of low-cost compressed air.

SINCE 1859 **GARDNER-DENVER**

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., Toronto, Ontario

THE QUALITY LEADER IN PUMPS, COMPRESSORS AND ROCK DRILLS

ADDITIONAL INFORMATION

On Any of the Products Mentioned in This Issue

Below is a complete index of the products referred to in both the editorial and advertising pages of this issue. If you desire additional information on any of them, use one of the accompanying addressed and stamped postcards in requesting it. In each case give name of product and page number. The information will come to you directly from the manufacturer involved, without any obligation on your part.

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Why is equal tension important, too?

Adequate tension and *high reaction* (the highest reactive value in the entire field of spring washers) are important advantages of the Verona *Fixed* Tension Triflex Spring; but *equal tension*, made possible by the exclusive "gauge design" which provides the means for fixing the tension on each bolt, is an important *safety* factor in preventing track buckling and pull-aparts.

The world's Finest Spring Washer

VERONA *Fixed* TENSION TRIFLEX SPRING

Woodings-Verona TOOL WORKS

VERONA, PA. • CHICAGO, ILL.

PERFECT *for eight-tamper gangs*

ROCK DRILLING

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SPRAY PAINTING

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EARTH SPADING

TRACK STABILIZATION (PRESSURE GROUTING)

and you'll find many extra uses for the great new—

Pneumatractor

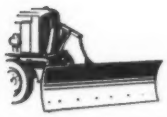
The Plus Compressor

Wherever you use air, here is your dependable, economical, and completely *mobile* supply. The *Pneumatractor's* 105-foot air capacity serves eight tie tampers or an adequate number of paint sprayers, sheet pile drivers, or other air tools. Its exclusive new Pneumapower motor is a marvel of compactness. And its revolutionary Pneumastat control, gives you economy such as you have never known—actual *proved* fuel savings up to 50 per cent!

Yet the *Pneumatractor* is more than a compressor, more than a tractor with power take-off. Fitted with auxiliary attachments, it is a veritable fleet of mobile power machines all in one. Some of its extra uses are shown at the left; your own ingenuity will suggest others. All this means less idle time for your *Pneumatractor* and greater return on your investment.

To make an intelligent choice of a compressor or any tamping equipment, you need, for comparison, full details regarding the *Pneumatractor* Write Schramm's Railway Sales Department for your copy of Bulletin NEU-50B today.

with auxiliary equipment the *Pneumatractor* does many jobs

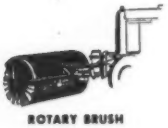

SNOW PLOW

TIE TAMPING

PNEUMAJACK

FRONT END LOADER

FRONT WINCH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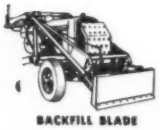
POST HOLE DIGGER

REAR WINCH


BACKFILL BLADE

SCHRAMM INC.

The Compressor People

WEST CHESTER • PENNSYLVANIA

For additional information, use postcard, pages 211-212

POSITIVE DOSAGE CONTROL and WEED KILLING ACTION

THE *Nalco* SYSTEM of WEED CONTROL

SPRAYING Nalco's H-170 "top-and-root" weed control with one of Nalco's new *labor-saving* Weed Control Cars provides positive dosage regulation, as well as complete records for future reference! H-170 is sprayed directly from tank car without mixing or dilution. It assures a complete top kill of all succulent vegetation, and extensive root kill to retard re-growth. Rainfall after application will not reduce H-170 effectiveness . . . Safe to use where livestock may be grazing . . . Will not disrupt track signal systems, or contaminate water supplies.

Write for detailed information on H-170 and the complete Nalco System of Weed Control.

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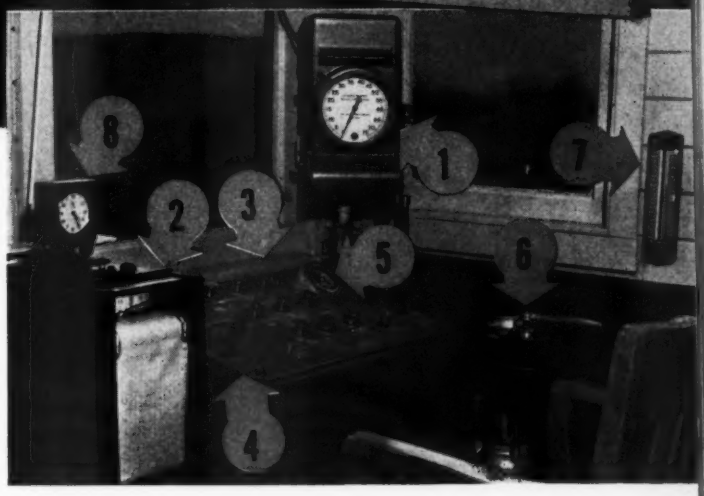
Canadian inquiries should be addressed to Alchem Limited, Burlington, Ontario



Top illustration shows Nalco Weed Control Car, with three-bank, 22-feet-wide sprays, and an additional 13-foot side spray boom for sidings. Lower photo shows operating controls of Spray Car. 1 Recording speedometer, 2 Recording H-170 flow meter, 3 Nozzle bank control valves for pinpoint spraying accuracy, 4 Left-side spray boom control, 5 Spray manifold pressure gauge, 6 Nalco Meter-Chem main control valve 7 Indoor-outdoor thermometers, 8 Timing clock. Not shown are intercommunicating telephone equipment for direct contact between Nalco Spray Car and work train locomotive, and direct-connected 50-foot auxiliary hose reel and spray nozzles for off-track spraying.

THE *Nalco* SYSTEM • Serving Railroads through Practical Applied Science

HOMELITE

HIGH CYCLE POWER HITS THE ROAD

to speed repairs and cut your maintenance costs

The Homelite Dual Purpose Generator is really high-balling its way into the hearts of railroad maintenance men. Because this lightweight, carryable, gasoline engine-driven generator is the *only* generator that can supply the proper power for the new cost-cutting high cycle power tools . . . *and at the same time* . . . provide 110 volt power for operating standard universal tools plus floodlights. Yes, and it can do it anywhere a job has to be done . . . even in the remotest power-poor areas.

The High Cycle Way is the Low Cost Way

High cycle tools such as grinders, impact wrenches, drills, concrete vibrators, chain saws, etc. are faster-acting, lighter-weight, easier to handle. With them, a man can do more work in less time than with standard universal tools. What's more . . . high cycle power tools are simpler in design, more trouble-free, easier to keep in perfect operating condition. Write, and Homelite representatives will gladly demonstrate, on the job, the savings in time and labor you can make with high cycle tools operated by the famous Homelite Dual Purpose Generator. Write today.

CARRYABLE

PUMPS • GENERATORS •

BLOWERS • CHAIN SAWS

PERFORMANCE · DEPENDABILITY · SERVICE

HOMELITE

CORPORATION

203 RIVERDALE AVENUE • PORT CHESTER, N. Y.

For additional information, use postcard, pages 211-212

YOUR EXTRA EMPLOYEE THAT WORKS WITHOUT PAY

RACINE *Portable* RAIL SAW

- CROP RAIL IN TRACK
- WILL NOT SHATTER OR BURN RAIL ENDS
- CUT OFF ANY LENGTH DOWN TO 1/10"
- NO TRAFFIC INTERFERENCE

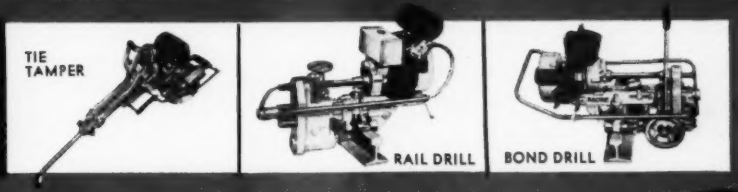
One man operates the RACINE Portable Rail Saw while it does the work of several hands. Designed specifically for cutting rail in track, it handles the job fast and dependably.

Cuts are smooth and accurate. Shattered and burned rail ends are eliminated. The possibility of rail failures from fractures that start with torch cutting or "nick and break" cropping is reduced.

Easily moved by two men, it does not hamper traffic. Operation is simple. Maintenance cost is low. Here is an "extra employee" you can rely upon for steady output under all conditions.

Write for new, 3-color catalog describing RACINE Railway Maintenance Machines.

OTHER RACINE PORTABLE MACHINES



RACINE TOOL AND MACHINE COMPANY
1738 State Street • Racine, Wisc.

RACINE

Penta*

protects poles, cross-arms and other wood construction

PENTA-PROTECTED wood effectively resists termites and decay, lasts up to *four times longer* than untreated wood. PENTA leaves wood clean, easy to work with and handle.

Specify PENTA-PROTECTED wood for poles, cross-arms, all wood construction. PENTA-PROTECTED wood is *dependable* wood—for years to come.

PENTA's superior performance record of the past 15 years *proves* it a *sure* wood preservative!

- PENTA-treated wood is *clean*.
- PENTA will not leach.
- PENTA is a chemical of constant, uniform effectiveness.

*PENTA is a popular abbreviation of the name of the chemical, PENTAchlorophenol.

THE DOW CHEMICAL COMPANY
MIDLAND, MICHIGAN

Write *for Dow's free booklet, "Pointers on Penta"*

The Dow Chemical Company
-ot. PE-25
Midland, Michigan

Name _____ Title _____

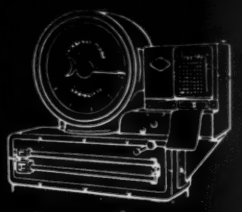
Company _____

Address _____

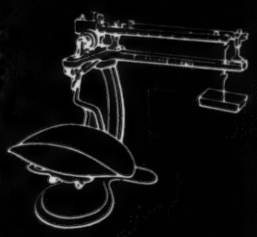
City _____ State _____

DOW
Penta
chlorophenol

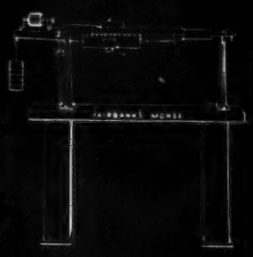
PRINTOMATIC DIAL SCALE
for accurate automatic weighing with weights recorded on tape or cards.



COUNTING SCALE
for fast, accurate counting of parts or pieces. Also made in dial types.

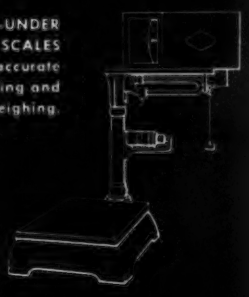


TYPE REGISTERING BEAM SCALES
assure fast, accurate weighing with weights recorded on a card. Non-registering beams also available.



PORTABLE DIAL SCALE
accurate weighing, direct reading dial for easy, fast operation.

OVER-AND-UNDER SCALES
for fast, accurate package filling and check weighing.



DIRECT READING BENCH DIAL SCALE
no mental calculations necessary—reduces chance for human error.

Accurate Every Weigh...

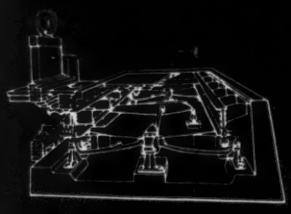
In Scales, the Name is . . .

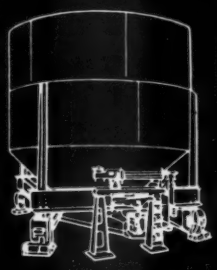
FAIRBANKS-MORSE,

a name worth remembering

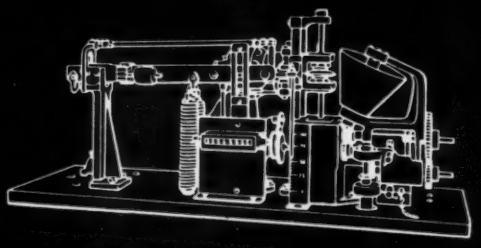
SCALES • PUMPS • ELECTRIC MOTORS • GENERATORS
LIGHT PLANTS • DIESEL, DUAL FUEL AND GASOLINE ENGINES

TRUCK SCALES
assure long life and sustained accuracy. More in service than any other make.



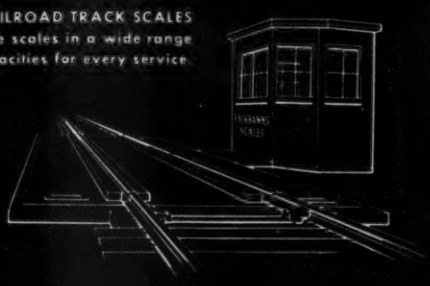


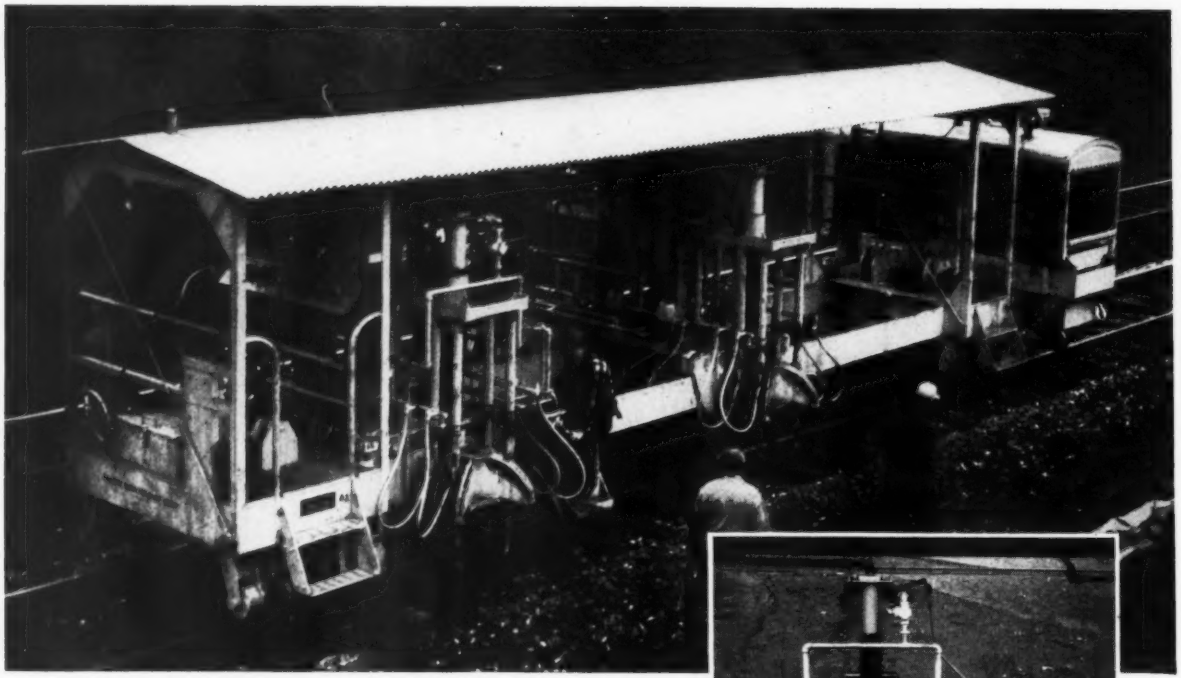
HOPPER SCALES
for accurate weighing of grain and other hopper-stored materials.



BELT CONVEYOR SCALES—
provide fast, accurate weighing and weight recording of material in transit.

RAILROAD TRACK SCALES
durable, accurate scales in a wide range of capacities for every service.





HR Track Raising and Air Tamping Machine Working on the Pennsylvania Railroad, Altoona Division, November 1950.

Now You Can Surface Track Efficiently and Save $1800 Per Mile

You can air tamp stone ballasted track with the HR Track Raising and Tamping Machine at a saving of up to $1800 per mile—over a comparable job with a multiple tool hand operated air tamping outfit. This machine is ideal for spot tamping and can be used for tamping out of face continuous raise with independent jacks.

It is equipped with two carriages, each mounted with 16 air tamping tools arranged in groups of eight centered over each rail, and is instrument controlled for simultaneous or independent operation on ties. The machine raises the track to pre-determined grade and cross levels. While tamping, it holds from 10 to 12 ties, depending on the spacing.

The Track Raiser is a self-propelled mobile unit, all operations air or hydraulic with a centralized control. Greater savings are possible on tracks ballasted with small stone, gravel or cinders. To learn more about operating economy and specifications write to Railway Maintenance Corporation, P.O. Box 1888, Pittsburgh 30, Pennsylvania.

Railway Maintenance Corporation

Designers and Manufacturers of: Moles; Super Moles; McWilliams Crib Cleaners; (R) Track Raiser and Air Tampers; McWilliams Multiple Tool Air Tamper; R.M.C. Rail Joint Packing.

LONG-RANGE WEED CONTROL PROGRAM GIVES CLEAN TRACK AT DIMINISHING ANNUAL COSTS

General Chemical offers tailor-made program for maintaining weed-free ballast . . . enables road to achieve clean track immediately with continuous reduction in regrowth.

Spray train operating in southwest territory. General Chemical's Weed Control Service provides modern spray trains and highly trained technicians.

Out of its extensive background in handling individual railroad weed problems, General Chemical has developed a modern method of control which now enables a road to achieve clean track immediately . . . with a continuous reduction in root growth, coupled with diminishing costs.

Such results are obtained by a two- or three-year program following an application schedule *especially tailored to overcome each road's particular weed problems.*

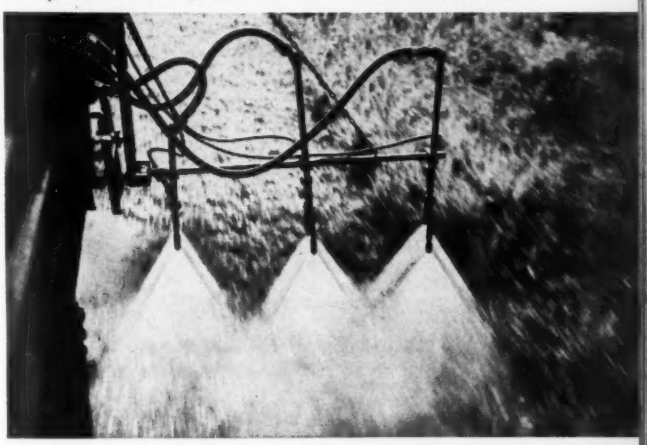
Aimed at control of perennial root systems, General's scientific method assures killing off of long established perennials; continually reducing amount of regrowth year after year; eliminating heavy seed germination; and preventing outside encroachment in subgrade. With this thorough method, track can be maintained in a relatively weed-free condition with minimum dosages!

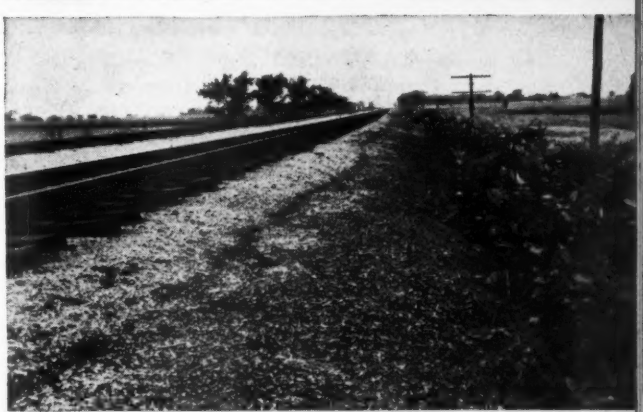
While initial costs may be somewhat greater than for temporary annual relief, such a high level of continuing control is achieved that the over-all long-range costs are far less and lead to increased savings. The end result is track which can be kept weed-free year after year with the smallest possible budget.

Important Information Available—

To help railroad managements in planning their weed control programs, General Chemical has just published a descriptive portfolio "A Policy Decision in Railroad Weed Control". Outlining General's method of treatment, it contains full color illustrations of results achieved in northern and southern areas. Copies may be obtained by writing on business letterhead to Weed Killer Department, General Chemical Division, Allied Chemical & Dye Corporation, 40 Rector Street, New York 6, N. Y.

Duplex spray system gives complete control for all conditions. Two sets of remote-controlled spray heads permit instant application of correct dosages for any type of weed growth and track conditions encountered.





Main line track in central Illinois shows typical results. Sub-grade and berm received a single treatment for two successive years. Now cleared of root systems of Goldenrod, Perennial Sunflower, Bracken, Dogbane, other weeds.

HOW TO CLEAN YARDS THE *Easy way*

with the NORDBERG "DSL" YARD CLEANER

Here is another Nordberg machine that makes a really tough track maintenance job easier.

The Nordberg DSL Yard Cleaner cleans track faster, better, and at a much lower cost. It cleans right down to the ties—and without damaging them.

The Yard Cleaner is a self-propelled unit with traveling speeds up to 15 mph. It moves on the rails with two in-gathering plows grading the intertrack and feeding material into an impeller. The impeller lifts this material and also that on the ties, cleaning off the web and base of the rail as well. It then deposits the material on two cross conveyors which in turn feed a 21-ft. wasting conveyor for disposal into high side gondolas on an adjacent track, into dump body push trucks or over the bank—as desired.

Having completed the cleaning job, the Nordberg DSL Yard Cleaner is easily removed from the track by a hydraulically-actuated run-off device.

Write for complete details covering this latest time and money-saving Nordberg machine.

Check these features:

- ✓ Exposes rail spikes and tops of all ties without damage.
- ✓ Grades to smooth uniform plane, level with tops of ties.
- ✓ Loads high side gondolas or dump cars on adjacent track, or dump body push trucks coupled to machine.
- ✓ No hand work required after cleaning operation.
- ✓ Track always in operating condition.
- ✓ Material removed is handled only once.

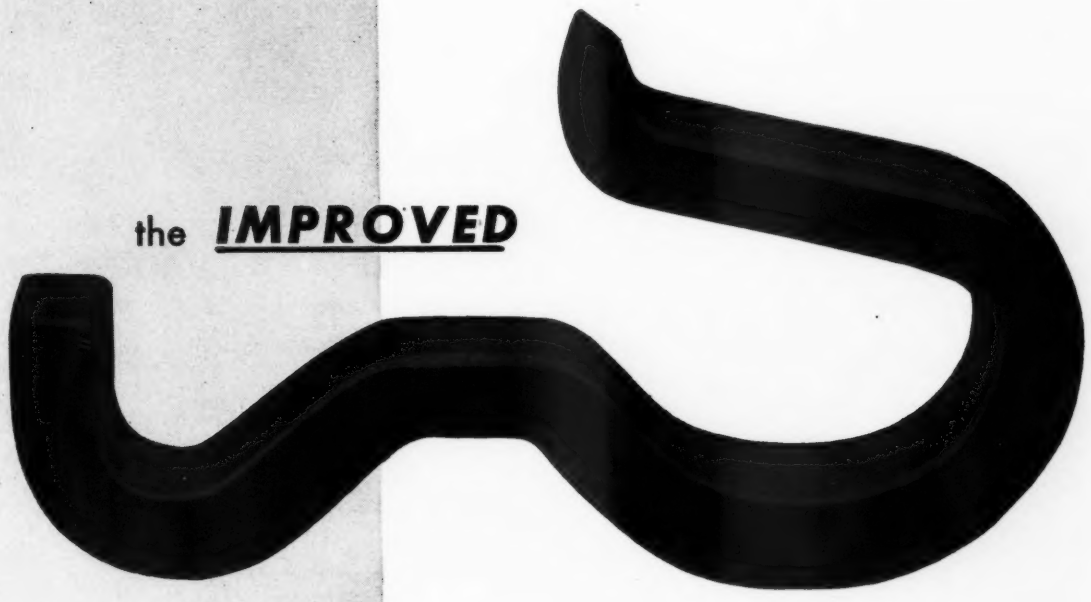
R351

Look to **NORDBERG**

. . . for continually improved **TRACK MAINTENANCE MACHINERY** *to do a Better, Faster Maintenance Job at Lower Cost*

NORDBERG MFG. CO., Milwaukee 7, Wisconsin

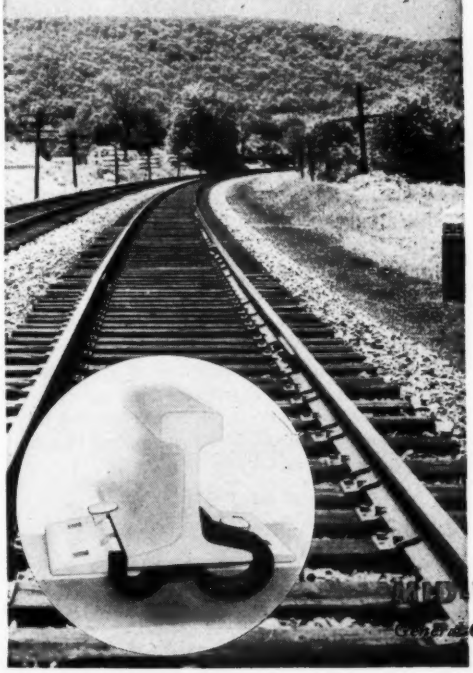
the ***IMPROVED***



GAUTIER

the ***finest*** in

RAIL ANCHORS



Gautier's four important counts on operating efficiency make it the outstanding rail anchor on the market today.

1. **SAVES LABOR:** A one piece anchor that can be applied quickly with a maul or spike maul.
2. **CAN'T BE OVERDRIVEN.**
3. **LOW MAINTENANCE COST:** Alloy spring steel plus scientific design assure long trouble-free service.
4. **FOR NEW OR OLD RAIL:** Substantial take-up and 4 point rail contact make the Gautier the most suitable rail anchor for re-application.

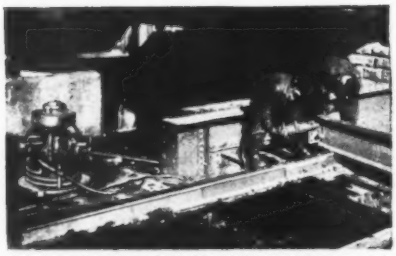
Manufactured and Sold Exclusively by:

MIDWEST FORGING & MANUFACTURING CO.

Offices: 38 So. Dearborn St. • Chicago 3, Ill. • Mfg. Plant • Chicago Heights, Ill.

New 4-TOOL TAMPING OUTFIT

36 cfm SPOT-AIR operates four MT-4 Tampers for TRACK MAINTENANCE GANGS



Many bridge and building jobs can be speeded up with the SPOT-AIR and a few air tools.

Rock-breaking and other maintenance of way jobs are easily handled with the SPOT-AIR.

The compactness and lightweight of the SPOT-AIR make jobs in out-of-the-way places easy to get at.

The new SPOT-AIR is the lightest, most compact section-gang compressor of its kind. Its 36-cfm capacity is ample to operate 4 Ingersoll-Rand MT-4 Tie Tampers . . . or a number of other Air Tools used on signal-maintenance, grade-crossing, and numerous emergency jobs.

This 265 pound compressor stands only 32 inches high on a 27-inch baseplate. It is extremely suitable for between-track work under traffic and takes no more space than one man on a section-car.

The self-contained arrangement of three gasoline-engine cylinders and three air cylinders alternately spaced around a vertical crankshaft gives a smooth conversion of engine torque into air power. The 3R-36 is completely air-cooled, thus permitting operation in any kind of weather with no danger of freezing or overheating.

Over 600 smaller-capacity SPOT-AIR compressors, Type 3R-30, have been in successful 2-tamper operation on railroads all over the country during the past two years. The new 3R-36, which delivers full 36 cfm of free air at 80 pounds pressure, has a number of up-to-the-minute improvements which make it the most efficient and easiest to maintain compressor of its type. See your nearest I-R representative for the full story on the SPOT-AIR and Ingersoll-Rand's complete line of Air Power equipment for railway maintenance.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 564-2

Other IR Air Power equipment for maintenance of way jobs

SPIKE DRIVERS • GRINDERS • IMPACTOOLS • WOODBORERS • RIVETING HAMMERS • RIVET BUSTERS • BACKFILL TAMPERS • PAVING BREAKERS • PUMPS

THE CHIEF READS **RAILWAY AGE**, TOO

—*Why don't you?*

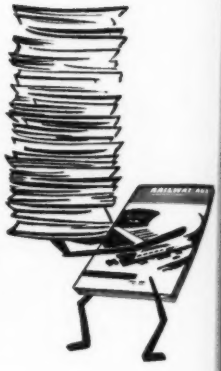
As the perfect supplement to the specialized information published in **Railway Engineering and Maintenance**, **Railway Age** is tailor-made for the professional railroader with a serious concern in his work — and his future.

Chances are **your** chief reads **Railway Age**, as well as **RE&M**. Why don't you follow his example? See the next page for the type of information you can regularly find in **Railway Age** — the greatest educational force in the railway industry today!

RAILWAY AGE 30 Church St., N. Y.

Here's what you'll find in **RAILWAY AGE!**

A Mountain of Information Covering Every Facet of Railway Service



Here's the type of *weekly* information *Railway Age* places in the hands of the ambitious railroader — thought-provoking information which should stimulate ideas *you* can use in *your* job:

NEWS: Full Coverage of the Week's News • Developments in Washington, D. C. • Personnel News of Railroads and Railroad Supply Companies • Detailed Statistics on Purchases, Earnings, Expenses, Operations; Equipment Orders Placed and Pending; Line Abandonments; New Construction Projects, Etc. • Weekly Developments in Railroad Finance—Average Stock and Bond Prices, Dividends, Etc. • Weekly Carloadings; Monthly Car Supply Situation Analysis • News of Railroad Supply Industry • Advance News of Meetings of Clubs and Organizations.

OPERATING: Practical Suggestions for Better Railroading • Problems of L.c.l. • On-Time Service • Loss and Damage Prevention • Expediting Freighthouse Operations • Train Accident Reports of I.C.C. Analyzed • Statistics of I.C.C., A.A.R. and Special Railway Age Compilations.

TRAFFIC AND RATES: How to Hold and Increase Business • How to Make Higher Rates More Palatable • How to Improve Customer Relations • Methods for Faster Service • Equipment and Technique to Handle Unusual Movements • Tested Traffic Research Techniques • Proceedings of Various Traffic Conventions, Traffic Clubs, Regional Shippers' Advisory Boards, Etc. • Rate Proceedings Before I.C.C. Conveniently Digested.

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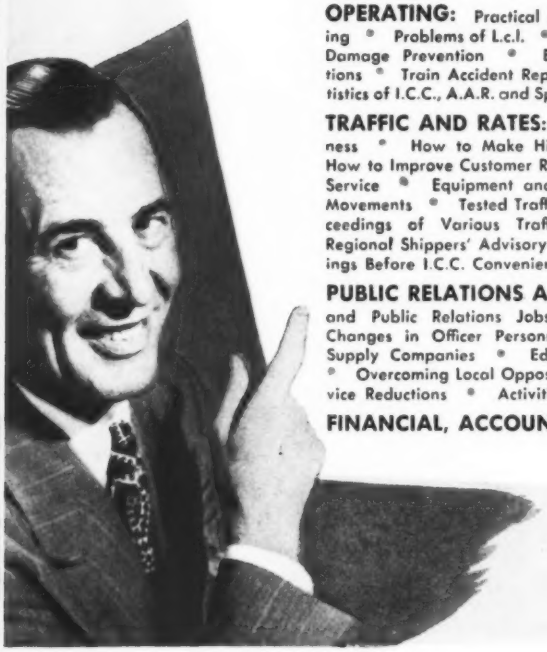

The career-minded railroader looks beyond the scope of his own particular department. He wants to know what's going on in all phases of railway activity. He wants to be kept abreast of the latest news of the industry. That's why he reads **Railway Age!**

And that's why **you** can confidently look to **Railway Age** for news and reports **on events in the making**—events that may affect your job, your future. It helps to solve your individual job problems with ideas and suggestions presented by a team of 25 experienced editors — highly-trained, technical-and-business-minded specialists who point out and interpret the latest trends in railway thinking and planning . . . supplying down-to-earth **usable** information on what is taking place in every part of the industry.

Think of **Railway Age** as a text-book of current railway events, an idea library, bringing you in weekly installments, news while it is still news, developments as they unfold. Over 5,000 pages of such authoritative information on up-to-the-minute railway practice, tools and materials, are made available to you each year — information which makes its thousands of subscribers the best informed, the most successful, railway supervisors, employees and officers.

If you're not yet a **Railway Age** subscriber, why not become one today?

RAILWAY AGE
30 Church St., New York 7, N. Y.

BALLAST IS SCREENED BY CONTRACT—— ELIMINATING INVESTMENT BY RAILROADS IN THIS ONE-OPERATION EQUIPMENT . . .

Stone ballast cleaned by the Speno method is thoroughly cleaned because it is screened twice. In order to obtain a thorough cleaning, two passes are necessary to restore the ballast to as clean a condition as when it was originally placed in the track. The two passes are accomplished in less time than a single pass by other mechanical methods.

Preferably, the ballast is cleaned ahead of a general track raise, and under the Speno method, no cribbing is necessary. Because of the drainage that the Speno method attains, the cleaning lasts from one general raise until it is time for another general raise, normally over a period of from three to six years, depending on conditions.

Speno equipment, working under traffic without interference with railroad operation, (the track adjacent to the one being worked is not fouled by our equipment in working position) easily keeps ahead of track raising programs.

The high production and low cost of this service are worthy of consideration.

ASK THE RAILROADS THAT HAVE USED US!

FRANK SPENO RAILROAD BALLAST CLEANING CO. INC.

306 North Cayuga Street — Ithaca, New York

No. 267 of a series

Railway Engineering and Maintenance

SIMMONS-BOARDMAN PUBLISHING CORPORATION

79 W. MONROE STREET
CHICAGO 3, ILL.

Subject: Serving the Industry

March 1, 1951

Dear Readers:

It is fundamental with magazines such as ours that they render a service to their readers and to the industries with which their readers are connected. Once a publication loses sight of this fundamental fact it simultaneously loses its right to continued existence. On the other hand, its value, and its justification for existence, can be continually fortified by a constant awareness on the part of the editors of the role of their magazine as a tool for promoting the welfare of the industry or field it serves.

Obviously, this awareness must be implemented by appropriate action. With most industrial magazines, including Maintenance, such action consists of the collecting and publishing of material that will help the readers do a better job. This includes articles describing ways of getting work done faster and more efficiently, of getting the most out of materials, devices and machines, and of promoting safety. To the extent that the ideas thus presented are put into practice by our readers the railroad industry is the beneficiary because it is thereby enabled to operate at lower costs and to render better service to its customers.

Occasionally, however, a magazine finds still other ways of serving the industry with which it is identified. The Railway Age is an example. For more than a year now this weekly publication has been devoting much of the space in one issue a month to articles telling in specific terms what the railroads are doing to improve and expedite the handling of freight traffic. At the same time the value of these articles to the railroads has been greatly enhanced by expanding the circulation of the magazine to include several thousand freight traffic managers of industrial concerns. These Freight Traffic Issues, as they are called, constitute a truly great service to the railroad industry because they are carrying the story of improved freight service to the very people who have the responsibility of deciding what method of transportation shall be used in shipping the products made by their companies.

What the Railway Age has done has been to take on the job of promoting good customer relations for the railroads while continuing to carry out the normal functions of an industrial magazine. We on the editorial staff of Maintenance, serving as we do also on the staff of the Railway Age, are proud of the opportunity of taking part in this worthy endeavor.

Yours sincerely,

Merwin H. Dick

MHD:ag

Editor

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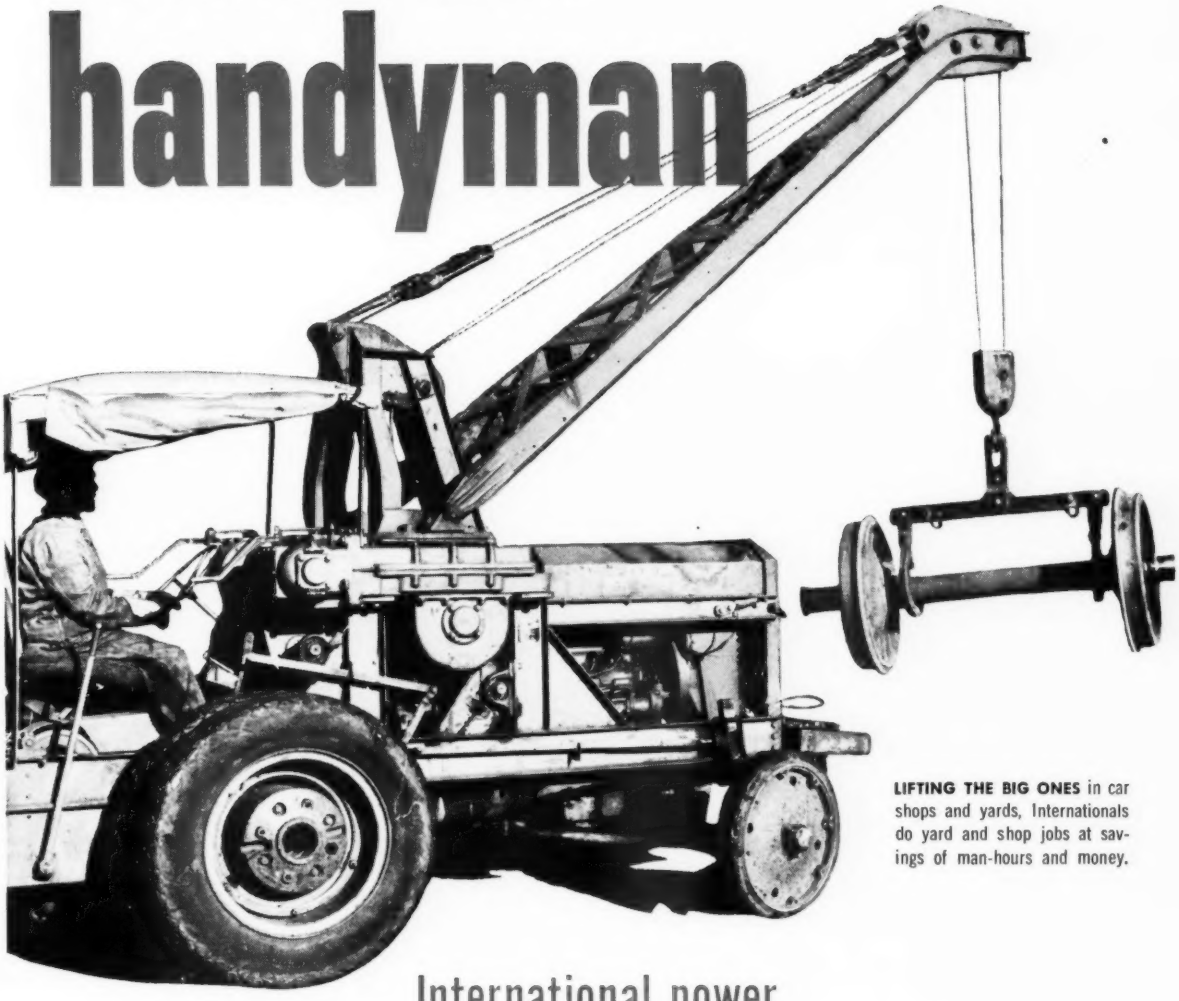
railroad handyman



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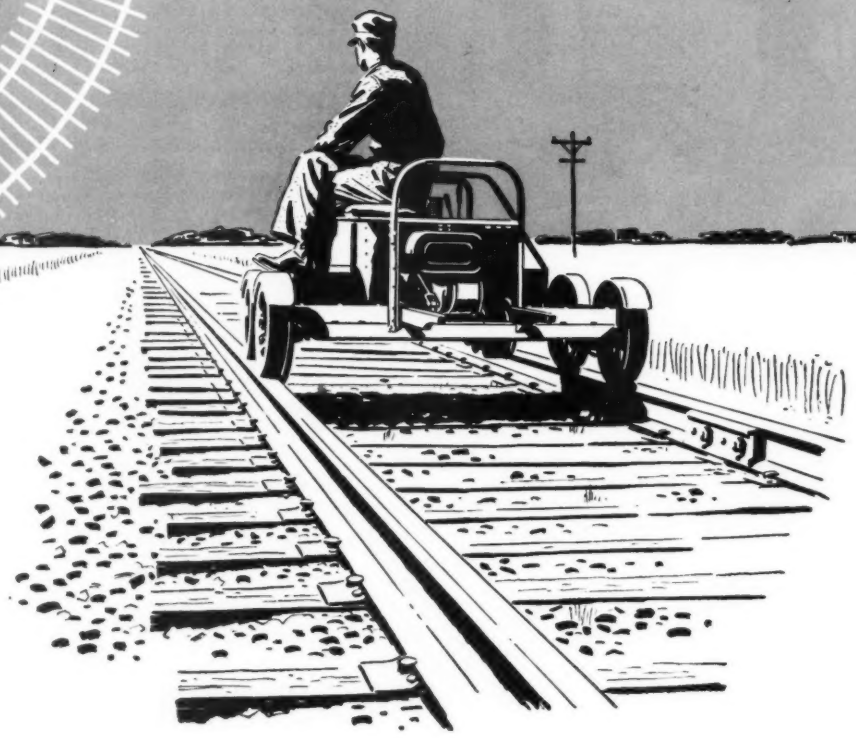

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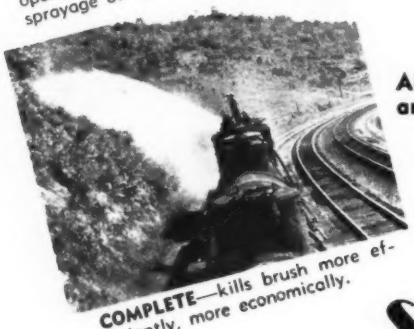

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The Emergency —

Its Challenge to the Maintenance Man

In these days of world turmoil and vast preparations for national defense, individuals, including railroad men, are apt to feel that their lives and the conditions affecting their work are largely at the mercy of forces over which they have no control. It would be foolhardy to try to argue that this isn't true, at least in a broad sense, but at the same time a good case can be made in behalf of the position that there is a great deal that the individual can do to alleviate the impact of these forces upon himself and his work. In fact, to do what he can in this direction is both a challenge and a responsibility.

Let's consider, for example, the situation now confronting railroad maintenance men with respect to prevailing and prospective shortages of materials, machines and manpower. For the individual maintenance man, from department chief to section foreman, the problem thus created logically divides itself into two parts: (1) What can I do to insure that my railroad will obtain adequate supplies of the materials needed to maintain the properties; and (2) what can I do to make certain that available supplies of materials and manpower, limited as they may be, will be utilized to the best advantage? What this amounts to is a restatement of the problem that had to be dealt with during World War II. In a sense, therefore, it is "old stuff", but nevertheless the whole matter must again be considered carefully in the light of any new conditions that may be in the picture today, such, for instance, as the 40-hr. week.

With respect to the first part of the problem, every maintenance man, especially if he is in the higher ranks, might well familiarize himself, if he has not already done so, with the present set-up in Washington with respect to the allocation of critical materials. As a start in this direction the article beginning on page 237 of this issue is recommended reading. While it is true that the railroads' battle for critical materials must largely be fought by the carriers as a group, acting through such established agencies as the Association of American Railroads, the action that is taken in this respect is of vital interest to every railway officer. While he may not be in a position to participate personally in this effort he can at least make a strong plea, before his own superiors, for the materials needed in his particular territory.

Regarding the second part of the problem (making the best use of available materials and manpower) every maintenance man will find endless opportunities for the full exercise of ingenuity, skill, and initiative. More work must be produced per man-hour, greater output must be obtained from work equipment, available materials must be apportioned for use where needed most, and ways must be found to make them last longer and otherwise to reduce the manpower and materials required for adequate maintenance. A realization that such opportunities exist is the first requisite to progress in this direction.

The degree to which the railroads will be successful in meeting the transportation needs of the country during the present emergency will be determined by the manner in which their employees, including those in the maintenance-of-way department, react to the problems inherent in the situation. Any tendency to view these problems as something regarding which the individual can do little or nothing must be discarded in favor of aggressive thinking and action.

REPLACING MACHINES —

It must be done sometime, but WHEN?

ACCORDING to many work-equipment supervisors, one of the most difficult of all their many jobs is that of convincing management that some of their machines should not be expected to last indefinitely. To try to get a replacement for a machine that can still be made to function is, in their parlance, "like pulling teeth". When a tooth must be pulled, a dentist usually places the blame either on inadequate use of the tooth brush or on too infrequent trips to the dentist. When a work-equipment supervisor asks for a replacement for a specific machine, management all too frequently infers that, if the machine is worn out, inadequate care has hastened its demise, and, if it is not worn out, asks, "Why must it be replaced now?"

In asking that question these men are not trying to evade the issue, they are sincere in wanting to know if it is better for their road to get a new machine NOW or to continue to use the old. But to the man trying to give the answer, the burden of proof seems overwhelming. He seldoms asks for authority to replace a particular machine until he has decided in his own mind on the kind of replacement equipment to be purchased, but he finds it hard to PROVE that it will pay to make the replacement now.

However, he tries. Armed with facts and figures, he soon stands before the "boss" and shows that the new equipment he proposes will "pay for itself" in cost saving in a specified period, such as two or three years. Or he may show that the annual cost saving will yield a "return" of a certain percentage on the new investment. Read or spoken quickly, these statements will seem to be different, but closer analysis will prove them similar. Also, their significance is open to question until someone arbitrarily decides what return or payoff period is best for the equipment in question. The return accepted by one "boss" may be turned down by another, and no one heretofore could prove either wrong.

It is, therefore, little wonder that equipment supervisors have long sought an effective method of establishing "beyond question" when it is economical to replace their machines. Research has now come to their aid. According to a feature article entitled "A Dynamic Equipment-Replacement Policy", that begins on page 245 of this issue, a formula has been devised that "reduces to specific terms all factors involved" in determining whether the replacement of a machine is economically justified. Sponsored by the Machinery & Allied Products Institute, this formula is being widely used and acclaimed by manufacturers as the first real advance of the last century in methods of analyzing the replaceability of equipment. Those who have used the formula claim that it has proved to them that their old short-payoff or rate-of-return method resulted in keeping machines in service beyond their economic service life, thereby adding to their costs.

Whether the formula is as adaptable to the problems of replacing maintenance-of-way machines as it is to the tools of industry has not as yet been fully determined. Should its adaptability to M/W use be proven, both higher officers and their subordinates will have at their disposal a common "yardstick" by means of which they can establish a "dynamic equipment policy". Hence, since the formula has important potentialities it deserves careful investigation.

CAMP CARS —

Need Greater Consideration This Year

FOR THE most part, railroads depend upon casual labor for carrying out their larger track-maintenance programs. Some of the men in this labor pool are little better than tramps, while others, being experienced "gandy dancers," like the work, and frequently return to the same railroad for employment year after year. This latter group forms the nucleus of many gangs, without which their performance would be greatly impaired. To make sure that this experienced labor group does not drift off into other fields at a time when the prospects are that a higher level of activity will prevail generally during 1951, and with labor shortages already being felt in some locations and expected to become more acute and widespread, some maintenance officers are giving closer attention to the housing of these employees.

Although important strides were made in the improvement of housing conditions during and following World War II—improvements that were prompted partly by the acute labor shortages that prevailed during the war—some roads are more advanced in this respect than others. Clean and comfortable surroundings, including recreation rooms, and modern lighting, heating, washing and kitchen facilities, are now widely accepted as being necessary if worker morale is to be maintained.

Now that cars and camps are being put into condition for the 1951 working season those railroads that are not up with the parade in equipping their camps may want to give greater attention to them. For one thing, many materials are procurable at this time that may be difficult to obtain later. Harking back to the days of World War II, it will be remembered that such things as electric plants, wiring and fixtures, refrigerators, metal sinks, kitchen stoves and hoods, water heaters, storage tanks, shower and lavatory fittings, heating units and piping, steel lockers and linoleum flooring—all items commonly used at labor camps—were in extremely short supply.

In view of the desirability of providing modern and comfortable labor camps because of the impending labor shortage, and keeping in mind the fact that the materials and equipment to do so will become increasingly difficult to obtain, it is necessary that this matter be given prompt attention on those roads where the present housing facilities are not up to the standards required by present-day conditions.

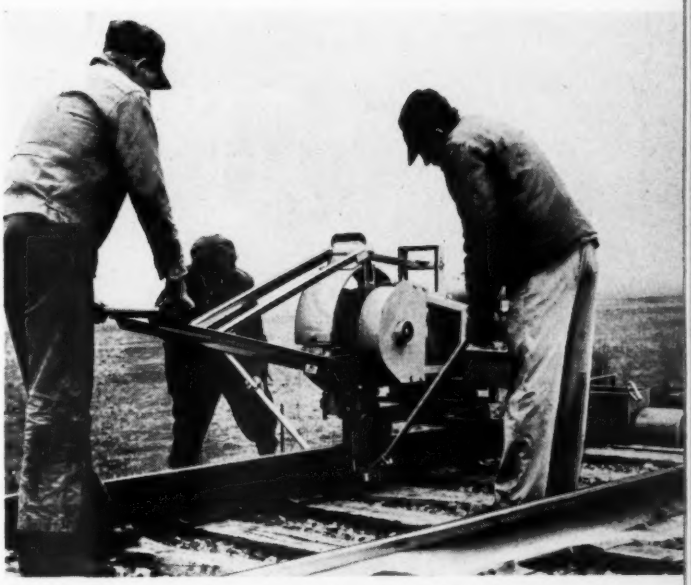
Another BIG Work-Equipment Year

Railways plan to spend $19,000,000 for 9,000 machines and power tools to help lay 1,980,000 net tons of rail, install 38,000,000 ties, and raise about 26,000 miles of track

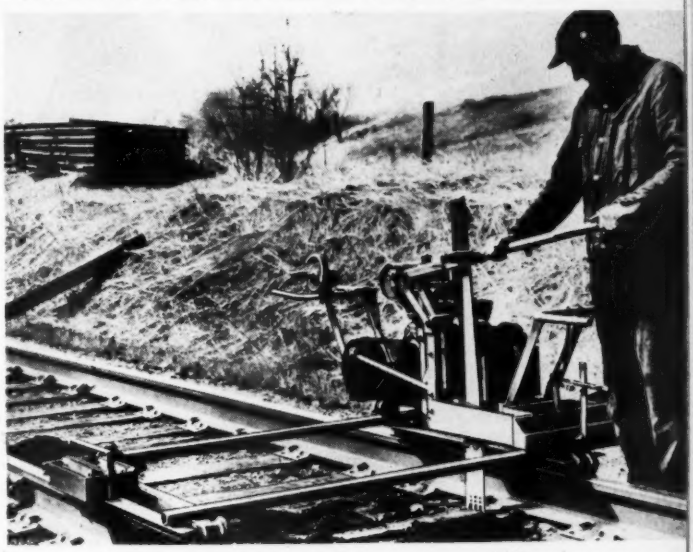
• For the first time in several years the amount of equipment which the railways will buy this year will probably be determined more by the ability of the equipment manufacturers to supply it than by the magnitude of the railroads' orders. The railroads have several good incentives to buy in volume: (1) To overcome anticipated labor shortages; and (2) to get as much work done as possible to keep their properties in the best of condition to handle an expected high volume of traffic. Finally, they expect revenues to be high enough to provide funds with which to buy all they can use effectively. These factors point to the conclusion that nothing less than the inability of suppliers to fill orders can possibly hold purchases to a volume as low as that of the last several years.

Even the characteristic reticence of maintenance officers to commit themselves so early in the year to the volume of their purchases has apparently been broken down by their needs, by their knowledge of the effectiveness of equipment, and by the expectations of their purchasing power. This lack of reticence is reflected in the replies received from the chief maintenance officers of a group of representative roads who were questioned by **Railway Engineering and Maintenance** as to how much work equipment and tools they expect to buy this year. Answers were received from 40 roads, all but nine of which gave details of their anticipated purchases. This is a larger number of specific replies than have been received from the railroads for several years.

Of the 40 officers replying to our inquiry, 31, representing 166,710 miles of line, reported that they plan to purchase at least 2882 units of equipment in 1951. The other nine roads indicated that their choice of specific units of equipment was, as yet, undecided. However, five of these roads gave the amount of money that they had allocated to the purchase of equipment during the year.



Because of an expected manpower shortage, coupled with larger maintenance programs, more machines will be needed this year



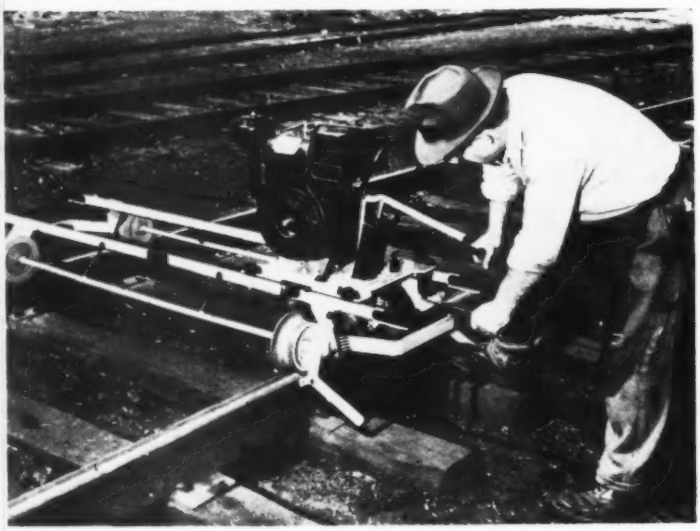
Dollar Volume Greater

From these specific replies and on the basis of the number of machines—both large and small—bought by the roads in recent years, it is conservatively estimated that all the railways of the United States and Canada will buy about 9000 units of equipment in 1951. This estimate of anticipated purchases compares with 8700 units of work equipment and tools purchased in each of the last two years and with 9300 units purchased in 1948. There is even a possibility that the 1948 volume of purchases can be exceeded if sufficient materials are made available throughout the year to enable manufacturers to fill all their orders.

On the basis of money reported as spent by the railways for their 1950 purchases, it is estimated that the 9000 units to be purchased in 1951 will cost about $19,000,000—only $100,000 less than the record volume established by the purchase of 9500 units in 1947.

Evidence that these figures are conservative can be found in the reports of 65 roads, made near the end of 1950, regarding the amount of money they planned to spend for work equipment in 1951. Of these roads, 42 expected to spend more in 1951, and 23 indicated they would spend less. These 65 roads as a group reported

Rail-laying equipment is in greater demand than usual this year to aid in the laying of 500,000 more tons than in 1950



that they had allocated a total of $7,164,159 for the purchase of equipment and tools this year. This amount is $2,005,656 or 39 per cent more than those same roads spent in 1950.

Labor May Get Scarce

Of the several influences tending to bring about such increased buying of work equipment, one of the strongest seems to be a possible shortage of labor later in the year. Chief engineers replying to our questionnaire on current maintenance problems have indicated that labor shortages are not expected everywhere, but they will undoubtedly be acute in industrial areas where manufacturing activities are being stepped up as a result of the defense effort. Of the 31 officers who reported on this problem, 14 expected severe trouble in securing as many laborers as they needed; seven foresaw no scarcity; and 10 declined to express an opinion as to the future availability of all the manpower they might need.

Most of those who expected labor shortages said they planned to overcome them to the greatest extent possible by the intensive use of existing work equipment, by the replacement of obsolete machines, and by the purchase of new types of power tools whenever available.

Typical of the discussions received on this problem is that of the officer who said, "We expect some difficulty in obtaining sufficient labor to meet our requirements this year . . . . To off-set this expected shortage, as well as the loss of productive man-hours due to the five-day week, we are continuing the purchase of all the labor-saving machinery that can be justified."

Another replied, "We expect to experience some trouble in obtaining sufficient labor to carry out our maintenance program. We will attempt to meet this situation when it arises, by more use of mechanized equipment and closer supervision. We hope that we will not have to employ older or inexperienced men with the resultant loss of efficiency that was so prevalent during the last war". Still another, who is a consistent buyer of work equipment, had this to say on the subject, "We are very much disturbed over the possibility of a labor shortage during the summer of 1951 and we may have to make use of labor contractors to furnish men locally, and possibly set up a labor camp in order to complete our resurfacing program".

Maintenance Programs Ambitious

It is unfortunate that the anticipated shortage of manpower is coming at a time when ambitious maintenance programs have been scheduled. On the basis of reports received by this magazine from representative engineering officers, it is estimated that the programs of the roads in Canada and the United States include the laying of about 1,980,000 net tons of rail, the installation of 38,000,000 crossties, the application of 34,300,000 net tons of ballast, and the out-of-face surfacing of 26,000 miles of track. This program is larger than the work accomplished in 1950 by at least 500,000 net tons of rail laid; 5,000,000 crossties installed; 1,000,000 tons of ballast applied and 1,000 miles of track raised. When such increases are considered, the demand for mechanized equipment with which to consumate the programs of the railways is apparent.

More B & B Work

However, even such heavy demands for the mechanization of track work do not outstrip the need this year for power tools and machines in the bridge and building departments. According to 27 chief engineers, more work on bridges and buildings is also planned during 1951 than has been accomplished in several years. Bridge maintenance activity will be greater this year on 16 of the roads these men represent, less on five roads and about the same on the other six. Building work will be more extensive on 14 roads, less on five and approximately the same on eight. Altogether these men have allocated $34,113,791—or $3,503,717 more than was spent in 1950—to the repair and renewal of bridges, and $44,642,267—or $4,063,663 more than charged in 1950—to the repair of buildings.

Thus, with the magnitude of maintenance programs so high, with prospects of a continuing scarcity of labor imminent and with traffic and income zooming, orders for work equipment are assured. Only scarcities in basic materials can prevent the filling of those orders and thereby hold equipment purchases under record totals.

Report from Washington—

Getting Materials For M/W Machines

By WALTER J. TAFT
Washington Editor

Because of shortages of materials the railroads are already experiencing difficulty in getting delivery of some of the things they need, including maintenance-of-way work equipment. As during World War II, machinery has been set up in Washington to handle the allocation of critical items. This article describes the set-up now in effect, tells of a revised method of allocation that is being prepared, and gives a general idea of the procedure involved in obtaining necessary materials.

• Once more an American defense program has made scarcities of materials and government controls the order of the day. As a consequence, in fulfilling their needs for materials and equipment, maintenance-of-way men and their suppliers, including the manufacturers of maintenance-of-way work equipment, must again live with conditions somewhat akin to those that prevailed in World War II.

While there are yet no formal arrangements in Washington for helping railroad suppliers obtain scarce materials, there is a plan for providing what is called "spot assistance" on "bottleneck items." The federal agency handling the matter is the Transportation Equipment Division of the National Production Authority. This division is headed by Robert L. Glenn, who was on the staff of the former Office of Defense Transportation during World War II and in the early post-war period.

Manufacturers of work equipment who are unable to deliver on railroad orders, because they lack some material or component part, may appeal to T.E.D. which will then undertake to arrange for delivery of the "bottleneck items." While the "spot assistance" arrangements are informal and thus somewhat flexible, they may be expected to be most effective in turning up materials or parts required to complete equipment actually on order by railroads. On the other hand, help in obtaining materials to manufacture for stock might not be entirely precluded, especially in cases where manufacture for stock is the normal basis of operations.

The present controls set-up has only one formal arrangement which applies to materials and equipment required by the railroads. This is the program for allocating steel products in sufficient quantities (approximately 310,000 tons a month) to build new freight cars at the rate of 10,000 per month, and to provide for "adequate" repair and maintenance of existing freight cars. This is an allocation program (as distinct from a priority arrangement) under which steel producers are required to deliver the allocated tonnages to car builders (including railroad shops) and manufacturers of component parts.

The only priority thus far established is the so-called "DO," or Defense Order priority. Generally, this is designed to meet the needs of the armed services; but it may also be used by a few other agencies, including one in the transport field—the Civil Aeronautics Administration. Orders with the DO rating have priority over all others, and where items are manufactured under this rating from materials in stock the manufacturer is permitted to use the rating in replenishing his inventory.

Present Set-Up Outlined

The basic authority to establish priority and allocation arrangements was granted to President Truman by the Defense Production Act, which became law when the President signed it on September 8, 1950. On the following day, the President issued an executive order delegating the authority to various agencies of the government.

The authority to establish priorities and allocations with respect to domestic rail, highway, and inland waterway transportation went to "that commissioner of the Interstate Commerce Commission who is responsible for the supervision of the Bureau of Service of the commission." Commissioner James K. Knudson became "that commissioner" by designation of the commission on September 11, 1950. On October 4, 1950, Commissioner Knudson established the Defense Transport Administration for the purpose of carrying out his priority and allocation functions. Mr. Knudson is director of D.T.A., but he continues also as a member of the I.C.C. The priority and allocation functions here involved are those which relate to use of facilities of the railroads and other transport agencies covered.

Meanwhile, the Secretary of Commerce, Charles Sawyer, got priority and allocation authority with respect to various materials in short supply, including steel and other metals; and the agency which he created to carry out the delegated powers is the National Production Authority. It is the N.P.A. which passes on the requirements of various branches of industry as presented through their "claimant-agencies." D.T.A is the agency for the transportation industry.

As noted above, N.P.A. has a Transportation Equipment Division. D.T.A. has a like division through which it performs its claimant role. It is called the Division of Materials and Equipment, and its director is Francis B. Robins, who is on leave of absence from his Atlantic Coast Line position of district superintendent of

the Wilmington district. During World War II, Mr. Robins served, in turn, as assistant chief of the former O.D.T.'s Materials and Equipment Division, and as director of the former War Production Board's Transportation Equipment Division.

The D.T.A. division which Mr. Robins heads was organized under the general supervision of P. A. Hollar, vice-president of the American Car & Foundry Co., who became a consultant to Mr. Knudson when D.T.A. was organized last October. Mr. Hollar served during World War II as director of the former O.D.T.'s Materials and Equipment Division. He is also a former assistant to the vice-president, Operations and Maintenance Department, Association of American Railroads.

In the over-all defense organization, D.T.A. and N.P.A., although they are attached to the I.C.C. and the Department of Commerce, respectively, come under the general supervision of the Defense Production Administration which is subordinate to the Office of War Mobilization. Director of the latter is Charles E. Wilson, former president of the General Electric Company, who reports directly to President Truman. D.P.A. is headed by William H. Harrison, while the administrator of N.P.A. is Manly Fleischmann. Also in the picture is the A.A.R.'s Purchases and Stores Division, whose executive vice-chairman, Charles E. Woodson, has been assisting in the collection and presentation of data to the government agencies.

On a Play-By-Ear Basis

As the foregoing indicates the procedures for obtaining scarce materials have been pretty much on a play-by-ear basis, except for the freight-car program. Briefly, the latter has worked this way: The requirements of contract builders and railroad shops are submitted to D.T.A., D.P.A. and

Materials for M/W Machines

Work equipment suppliers give expressions of opinion regarding their ability to make deliveries on railroad orders in view of current shortages of materials

From the Viewpoint of

• To supplement the foregoing discussion of the machinery now in effect in Washington for allocating critical materials, executives of a number of manufacturers of maintenance-of-way work equipment were requested to give information regarding their ability to fill railroad orders in 1951. In general the replies indicated that some difficulties are being experienced, but there is a strong undercurrent of thought to the effect that ultimately, when a more formal and comprehensive plan for allocating materials is placed in effect, the railroads will fare reasonably well in getting their requirements of machines and other products. Direct quotations from the replies received, indicating where feasible the nature of the machines manufactured, are given below.

Cranes and Shovels—"There are several thousand items that go into the make-up of the products we build. Much of this material we can obtain with reasonable promptness. Much more of it we obtain but with some difficulty . . . Our records show many and many a shipment is held up for lack of one or two relatively small parts. We find a DO of little help although it would appear that the time will arrive when a DO will be necessary to obtain material at all . . ."

Crawler Tractors—"The factor that will determine how much of our equipment will go to the railroads, after the government has taken its needs, of course, is whether or not the railroads can get Defense Order ratings for the equipment they need. It would seem that the railroads would have little trouble in getting DO ratings for our equipment since they are an essential industry in time of emergency . . . But the railroads must convince the government that they need the equipment to uphold their end of the war effort."

Tie Tampers, Ballast Cleaners, etc.—"Based on our present material-procurement progress, it is my opinion, that, unless further defense production is authorized during 1951, we will require 12 months instead of the usual 3 to 4 months to secure certain critical items such as gears, motors, transmissions, etc. I believe that steel and castings will require four to five months to secure instead of the usual two or three. As for 1952, I believe that the time required for the procurement of materials will be even further extended than it will be during 1951 . . ."

Crawler Tractors—"We have been able to fill all orders that have been received so far this season; however, the forecast for the balance of the 1951 season is very problematical . . . War emergency requirements which carry a DO rating carry a priority over all civilian orders, and at this time we have a considerable number of these orders and do not know the number that will be received in the future which would effect deliveries for domestic use."

Rail Grinders, etc.—"Orders in hand will tax our capacity until early spring. Have had difficulty in obtaining certain materials, and orders we are now placing carry delivery promises as far ahead as next September. Suppliers claim delay in shipments due to our failure to furnish DO number. With this priority, we believe we could fulfill our obligations to customers . . ."

Electric Generators and Tools—"Our scheduled production, including present defense orders, is such as to permit delivery to the railroads of normal quantities of work equipment of the type we manufacture. However, even though our permitted use of basic metals is such as to support this schedule, we are finding it increasingly difficult to obtain delivery on orders not supported by DO ratings. Therefore, it appears that there may be some shortages during the year—or at least a delay in our ability to make deliveries."

Motor Cars and Other Machines—"We are doing everything possible to supply the railroads with their entire requirements of work equipment for 1951. At the present time, and under the present general conditions, we do not see too much difficulty in making good our promise. It is quite possible that the deliveries may not be as prompt as we would like them but within reasonableness we feel that we stand a pretty good chance of effecting fairly satisfactory deliveries, and in suitable quantity . . . I believe, a system of allocation of material and control will ultimately be provided which will result in a flow of materials to the manufacturers for railway use."

Locomotive Cranes, etc.—"So far the procurement of materials for the products we manufacture has been unsupported by either allocation or priorities. It seems to be a fact that DO's are very impotent and only constitute a hunting license for the manufacturer to procure materials. Allocations as set up have not worked out nor have they been extended to the production-tool manufacturer. It is a very serious problem as to our ability to secure material for the orders that we have on hand for railroads . . ."

N.P.A. After "screening," a program is approved and referred to N.P.A.'s Transportation Equipment Division for "implementation," as the bureaucrats say. That means that T.E.D. issues authorizations permitting builders and railroad shops to place certified orders with the steel producers. These certified orders are calls for delivery of the steel allocated to the car program. If D.T.A. is not satisfied with the actions of D.P.A. or N.P.A., it can appeal to O.D.M.

Arrangements for meeting railroad requirements for equipment and materials other than freight cars are expected to be off the play-by-ear basis on July 1. The defense agencies anticipate that by that date they will have established something like the Controlled Materials Plan which was in effect during World War II. Under such a plan everything the railroads need in the way of scarce materials would be on an allocation and certification basis.

It is anticipated, however, that the only requirements rating separate allocation programs would be those for new cars and locomotives. Thus the requirements for maintenance-of-way work equipment would be lumped with those for maintenance, repair and operating supplies, shop tools, office machines, etc.

Generally, procedures under the contemplated "C.M.P." set-up are expected to be along lines of those now in effect with respect to the freight-car program. If that expectation is realized, a manufacturer of maintenance-of-way work equipment would submit his requirements for the controlled materials to D.T.A., D.P.A. and N.P.A., hoping for the best as those agencies did their "screening" and "implementing." Meanwhile, however, it should be said that new ideas may change what is now contemplated. Only one thing about the allocation set-up appears fairly definite at this time—the situation is "fluid."

the Manufacturers

Tie Tampers; Ballast Cleaners—"In the year 1951 we do not foresee any difficulties in filling orders for our equipment. Many of our machines are imported from abroad, and we have budgeted some time ago for our anticipated needs based on normal expectations for this country. In addition to this, we have made arrangements to manufacture machines in this country, and we expect allocation of the necessary material to carry out our orders."

Rail Saws, Unit Tampers, etc.—"There is little doubt that, without priority assistance, our output of maintenance equipment for the railroads will have to be curtailed. Since allotments for scarce materials such as aluminum and brass are based on periods in which the demand for accelerated production had not yet developed, our supplies for non-rated orders are already falling short of requirements. Thus, it would seem that our performance on railroad orders during 1951 will fall short of needs unless we are granted a greater allotment of critical materials for non-rated orders, or unless the railroads secure a priority rating which will permit the purchase of materials over and beyond the quantities allowed us under the restricting orders."

Rail-Laying Machines, etc.—"We set up a production schedule in the last half of 1950 so that we would have a quantity of machines, equal to about 80 percent of our first half of 1950 sales, available for delivery in the first quarter of 1951. In June of last year it was, of course, quite impossible to have predicted that purchases of machines in early 1951 would far exceed purchases for the same period in 1950. This being the case, our 80 per cent was not adequate and additional lots were placed in our production schedule late in 1950. At the present time we believe we will be able to meet almost all demands for our equipment but we will not be able to deliver as promptly as we have in past years. . .

"The principal difficulty we are having at the moment is in procuring the necessary raw materials . . . The situation is a day-to-day problem of handling minor and major crises. For example, our purchasing department told us yesterday that a certain steel, promised for delivery in early January, will not be available until March. A bearing supplier advised us that they now have a number of orders carrying DO ratings and the bearings we have on order with them have been rescheduled so that instead of getting them in late January we will not get them until early April . . . These examples are typical of what we are faced with daily."

Locomotive Cranes—"Our ability to supply equipment to the railroads is limited only by our ability to procure material. By this we mean that at the present writing we have very few direct government orders in our shops and practically no priority work. At the present time our deliveries are of course extended due to the volume of business we have booked with the railroads, steel mills and our regular so-called peace-time customers. We of course anticipate some form of controlled materials plan but cannot help but feel that if such assistance is put into effect the American railroads will probably receive rather high priorities for necessary equipment. . ."

Ballast Cleaners, etc.—"At the present time, we anticipate making reasonable deliveries of most of our items of equipment in considerably larger volume during the first six months of 1951 than we did during 1950 . . . While we expect to be handling a large volume of direct war contracts during the second six months of 1951, these should not interfere with our ability to produce goods for the railroads. If, at that time, railroads can provide us with priority ratings good enough for procuring steel and other raw materials, we shall continue to deliver any reasonable quantities for the remainder of the year."

Air Compressors—"I would say that we are in a position to give very good deliveries on railroad type of equipment. I do not believe this condition will change unless we have a complete mobilization or a complete priority system. If we go into the latter, railroads will, no doubt, be able to obtain priorities for their urgently-needed equipment."

Various Machines—"At this writing we expect to be able to fill normal requirements for our products within 30 to 60 days, depending on the type of unit. Deliveries at present are governed by shortage of skilled, competent help more frequently than material."

Tie Tampers, etc.—"The effect of shortages will not be felt by us immediately, but unless the transportation industry as a whole is given allocations or priorities good enough to compete with war and military contractors there will be difficulties experienced in replenishing inventories. In view of the importance of the transportation industry, we feel quite sure that manufacturers of railroad work equipment will eventually obtain preferential ratings for application to their purchase orders to suppliers so that they will be able at least to compete for materials. . ."

Various Machines—"So far as we are able to foresee at the moment, we feel that we shall be able to supply materials which this company furnishes the railroads during 1951. This view is predicted, of course, upon a hope that a consistent program will be worked out in Washington whereby the railroads' maintenance needs, along with others for the railroads, will be given equal prominence in any program that is established."

Spreaders—At the present time this company's productive facilities are scheduled through the month of August with orders which have been received. We are prepared material-wise to make deliveries through the month of February. Normal allotments for steel have been cut as much as 75 per cent from regular mill sources and almost that figure from warehouses. Unless material becomes more available to the maintenance-of-way equipment manufacturers in the near future, it is our candid opinion that the equipment desired by the railroads will not be delivered in the quantities and on the schedules required by them."

Talks on Timely Topics Feature A.R.E.A. Program

Many addresses will supplement the reports of committees at convention to be held March 13-15 at the Palmer House, Chicago. John E. Armstrong to receive honorary membership

TO THE READERS OF
RAILWAY ENGINEERING AND MAINTENANCE:

By many of you this message will be read either at the A.R.E.A. convention, to be held at the Palmer House, March 13-15, or as you are making last-minute plans to depart for the meeting. Obviously it will be read by many others, both members and non-members of the A.R.E.A., who will not be present at the meeting. While expressing the hope that as many as possible of you will be able to attend, I wish to emphasize that this statement is addressed to all of you whether or not you will be at the convention.

Since its inception the A.R.E.A. has been a powerful force for the promotion of sound engineering and maintenance practices on the railways of this country. Through its standing and special committees, now numbering 22, studies have been made on every conceivable problem confronting engineering and maintenance officers. These studies have frequently led to the adoption of conclusions which are incorporated in the association's Manual of recommended practice. In recent years increasing use has been made of research as a tool for developing improved practices, and for determining the relative merits of materials and devices. In this work our committees are in close collaboration with the research staff of the Engineering division, Association of American Railroads, which recently built a modern testing laboratory at Chicago at a total cost of approximately $1 million.

During times of national emergency the work of the association takes on added importance. In World War II emergency committees were established to handle changes in standards necessitated by shortages of materials, and the efforts of the standing committees were enlisted in a campaign to develop ways of conserving critical materials and labor.

Now the country faces another emergency, perhaps even more serious in its implications than that produced by World War II. Again the A.R.E.A. will commit its full resources to the solution of any coincident emergency problems that come wthin its sphere of activity. Already the emergency committees that were set up during the last war have been re-activated, and other steps have been taken to gear the association to the nation's defense mobilization program.

A sound and adequate railroad fixed plant is recognized in all responsible quarters as being necessary to the nation's welfare, in peace or in war. Your responsibility as a railway maintenance man is to do what you can to keep the property under your supervision in a condition adequate to carry the volume of traffic that may move over it. In fulfilling this responsibility various courses of action are open to you. For one thing, if you are a member of the A.R.E.A., you can lend your full support to the activities of that organization. If you are not a member, but are eligible to become one, you can, by joining the association, become a supporting element in its activities, not overlooking the benefits you personally and your railroad will derive through such membership.

The A.R.E.A. is a servant of the railroads and of the nation. Membership in the association offers the opportunity of not only serving the railroad industry in peace and in war, but also of helping to insure that the country will have the kind of transport system that is so badly needed when it is threatened by aggressor nations.

H. S. LOEFFLER
President
American Railway Engineering Association

H. S. Loeffler

• In addition to the reports of the technical committees, and other regular features, the convention program of the American Railway Engineering Association will again this year, as during the two previous meetings, be characterized by an unusual number of addresses, including 13 which will be presented in connection with the committee reports.

An outstanding feature of the meeting will be an address by J. M. Budd, vice-president, operations, Great Northern, which will be delivered at the annual luncheon on Wednesday, March 14. The subject: "American Railroads at Mid-Century." Another event of special interest will be the presentation of an honorary membership to John E. Armstrong, chief engineer, Canadian Pacific.

Setting the keynote of the meeting, J. H. Aydelott, vice-president, Operations and Maintenance department, Association of American Railroads, will speak at the opening session on the subject, "A Wartime Economy—Will It Leave the Railroads Unscathed?" The junior members will then have their moment in the spotlight in the form of an address by P. T. Trax, assistant supervisor of track, Pennsylvania, who will speak on "A.R.E.A.—From the Viewpoint of a Junior Member." Next the emphasis will shift to research as G. M. Magee, research engineer, Engineering Division, A.A.R., speaks on "Highlights in Engineering Research." Particular aspects of the railroads' research program will be covered in five of the addresses to be presented in connection with committee reports.

PROGRAM

Fiftieth Annual Meeting
Palmer House, Chicago

TUESDAY, MARCH 13

Morning Session—9:45 a.m.

Address by H. S. Loeffler, President
Reports of Secretary and Treasurer
Greetings from Signal Section, A.A.R., D. W. Fuller, Chairman
Greetings from the Electrical Section, A.A.R., H. F. Finnemore, Chairman
Address by J. H. Aydelott, vice-president, A.A.R., on "A Wartime Economy—Will It Leave the Railroads Unscathed?"
Presentation of Honorary Membership to John Edwin Armstrong
Address by P. T. Trax, assistant supervisor of track, Pennsylvania, on "A.R.E.A.—From the Viewpoint of a Junior Member."
Address by G. M. Magee, research engineer, A. A. R., on "Highlights in Engineering Research"
Reports of Committees on
- Highways
  - Address by General James A. Anderson, commissioner of highways, Virginia, and president, A.A.S.H.O., on "Highways"
- Cooperative Relations with Universities
  - Address by O. W. Eshbach, dean, Northwestern Technological Institute, on "Future Needs, and the Supply of Technical Personnel for the Railroads"

Afternoon Session—2:00 p.m.

Reports of Committees on
- Water Service and Sanitation
- Yards and Terminals
- Uniform General Contract Forms
- Records and Accounts
  - Address by J. B. Akers, chief engineer, Southern, on "Obsolescence in the Dieselization Program"
- Economics of Railway Location and Operation
  - Address by Dr. L. K. Sillcox, executive vice-president, New York Air Brake Company, on "Terminals and Trains"

WEDNESDAY, MARCH 14

Morning Session—9:00 a.m.

Reports of Committees on
- Maintenance of Way Work Equipment
- Economics of Railway Labor
  - Address by G. M. O'Rourke, assistant engineer maintenance of way, Illinois Central, on "Impressions of a Group of European Railway Maintenance-of-Way Engineers on Their Tour of U. S. Railroads."
- Buildings
  - Address by J. P. Gallagher, general superintendent of insurance and fire protection, New York Central, on "Fire Prevention"
- Wood Preservation
- Roadway and Ballast
- Continuous Welded Rail

Association Luncheon—12:00 Noon

Announcement of results of election of officers
Address by J. M. Budd, vice-president, operation, Great Northern, on "American Railroads at Mid-Century"

Afternoon Session—2:30 p.m.

Reports of Committees on
- Ties
  - Address by G. M. Magee, research engineer, A. A. R., on "Progress in Crosstie Research"
- Track
- Rail
  - Address by G. M. Magee, research engineer, A.A.R., on "Rail Failure Statistics and Their Reporting"
  - Address by L. S. Crane, engineer of tests, Southern, on "Research Attack on the Shelly Rail Problem"
  - Address by R. E. Cramer, special research associate professor, University of Illinois, on "Shelly Rail Studies at the University of Illinois"
  - Address by R. E. Jensen, special research assistant professor of Engineering Materials, University of Illinois, on "Review of Joint Bar Research"

THURSDAY, MARCH 15

Morning Session—9:00 a.m.

Reports of Committees on
- Wood Bridges and Trestles
  - Address by J. L. Leggett, professor, University of Kentucky, on "Fatigue Tests of Timber Stringers"
- Clearances
- Waterproofing
- Impact and Bridge Stresses
- Masonry
  - Address by G. H. Paris, railroad representative, Structural and Railway Bureau, Portland Cement Association, on "Prestressed Concrete"
- Iron and Steel Structures

H. M. McFarlane

MANUFACTURERS PLEDGE HELP TO THE RAILROADS

In keeping with our agreement with the Track Supply Association and the Bridge and Building Supply Men's Association, resulting in exhibitions being held every 18 months beginning with September, 1950, the National Railway Appliances Association is not holding its usual exhibition this year in connection with the A.R.E.A. convention. Our next show is scheduled to be held in March, 1952.

In the meantime our member companies continue to exert every effort toward the improvement of their products and are doing their best to fill the requirements of the railroads so that they will be able to meet the demands placed on them as a result of the country's defense preparations.

An effort has been made to encourage the railroads' representatives in their program of informing the Defense Transporation Administration of the needs of the railroad system, in order that they might obtain allocations for the materials required by the roadway departments. Also, our members hope to offer better materials and appliances that will require a minimum of maintenance expense, and labor-saving equipment that will help offset shortages of manpower.

We are proud to have a part in assisting the railroads to meet their obligations of service to industry and to the armed forces.

H. M. McFARLANE
President
National Railway Appliances Association

Right—Driving piles on the Burlington's Centennial cutoff with a Lorain Moto-Crane. About two bents a day were driven in this manner

Below—A Michigan Model T6K truck crane laying rail on the South Shore. The road has also found a variety of other uses for this unit

Cranes on Rubber

Find Many Uses in M/W Work

Cleaning a draingage ditch on the main line of the Northern Pacific south of Auburn, Wash., with a Quickway truck-shovel. The road also uses machines of this type, with proper attachments, for many other jobs, including rail laying on mountain curves

Combining mobility with versatility, truck cranes are regarded as having advantages for various operations involved in maintaining the tracks and structures. The characteristics of these cranes and some of their applications in the maintenance field are described and pictured in this article.

• Cranes, excavating and material-handling units mounted on rubber tires are being seen in increasing numbers doing all kinds of maintenance work on the railroads. These machines have a high degree of maneuverability around the right of way and yet they can be moved from job to job relatively fast, some at regular truck speeds. Being possessed of these characteristics it is not surprising that they are finding a definite niche for themselves as an off-track tool of the maintenance forces.

A number of manufacturers are

A Lima Type 34-T clamshell with a 45-ft. boom and a ¾-yd. bucket. The mobility of truck cranes permits them to be used effectively for materials handling and excavating at locations to which ready access may be had from streets or highways

A Bucyrus-Erie H-3 Hydrocrane laying rails for a mile-long track being constructed for an industry at Goodwin, Wis. Fitted with a clamshell bucket this unit is also adaptable to excavating work

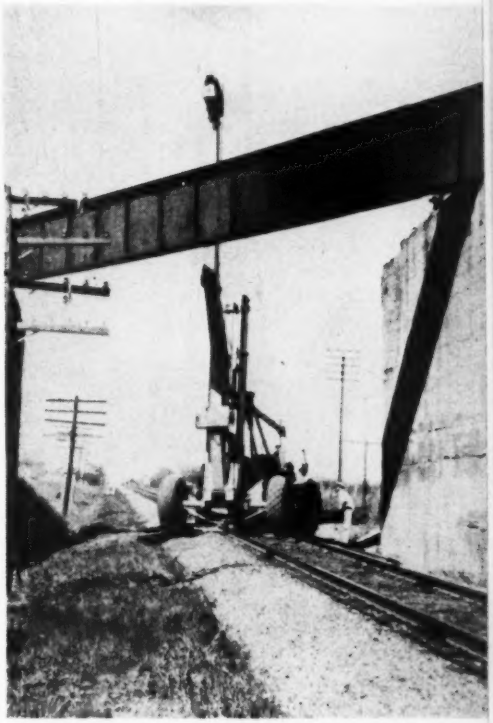
They may be operated with draglines too. This is a Schield Bantam ⅜-yd. truck-mounted shovel-crane operating a dragline in close-quarter yard work. Removal of slides, bank widening and ditching are other possible applications of such machines

making cranes mounted on rubber wheels. Depending somewhat on the size, they are variously known as truck cranes, mobile cranes or motor cranes. The material handling capacity varies from ¼ yd. up to ¾ yd. or more, with the lifting capacity ranging all the way up to 35 tons and possibly higher. Some makes are available with outriggers to give greater stability when lifting.

In some models of truck cranes a single engine provides power for propelling the unit and for operating the turntable or boom, while other models have separate engines for travel and for the turntable. In most models there are two cabs, although some have only one.

All makes of rubber-mounted cranes may be converted to a variety of different operations. In addition to crane booms, the attachments available for this purpose, although generally not all with the same machine, include clamshell buckets, dragline buckets, shovels, trench or backhoes, and lifting magnets. Thus, being adaptable to all kinds of lifting, excavating, and material-handling work, they have many applications in railway maintenance.

A grand division on one railroad is reported to have six truck cranes, with two more on order. These machines are used a considerable part of the time for cleaning side ditches, a backhoe attachment being used when this kind of work is done. With this same attach-



While it is not a truck crane in the true sense of the word, the Tournacrane, being mounted on rubber tires, has similar characteristics from the standpoint of its applicability to railroad work

Truck cranes equipped with clamshell buckets can be used for a wide variety of excavating and material-handling jobs. This Osgood Mobilcrane is loading material from a stock pile into trucks

A Link-Belt Speeder HC-70 truck crane, equipped with a clamshell bucket, removing old ballast from track on the Boston & Maine and loading it into truck at right. Work was done between rush hours

Quickway truck-shovel loading 132-lb. rail for a relay job on the Northern Pacific. On one rail-laying project, between Pasco, Wash., and Prosser, this machine is said to have laid an average of one hundred twenty-five 115-lb rails per day

Truck cranes are being found to have advantages when doing maintenance work involving bridges over streets. This Harnischfeger Model 150 truck crane is handling materials on a project involving the rebuilding of a masonry bridge seat

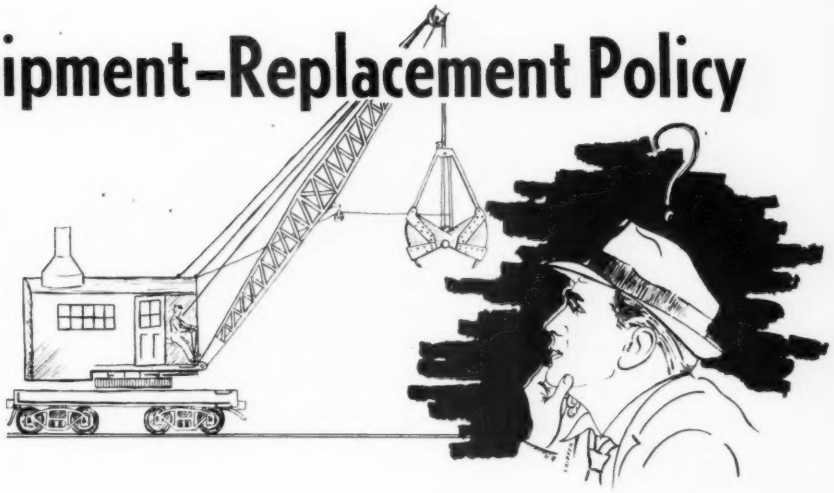
ment they are employed for other material-handling jobs, including the piling or loading of manure removed from stock cars. Handling and laying rails are other operations for which these machines have been used to good advantage. One of these units is reported to have laid an average of 125–115-lb. rails a day on one job. This same machine was said to have performed satisfactorily in laying 132-lb. rail in mountainous territory.

The truck crane knows no departmental boundaries. In addition to track and right-of-way work generally, they have many applications in the bridge and building department. A use for which they are found to have particular advantages, due largely to their mobility, is in connection with repairs to bridges carrying tracks across streets. In at least one instance a truck crane was used with good results by a contractor for driving piles for new timber trestles.

Accompanying this article are photographs showing 10 different makes of rubber-tired cranes performing a variety of different operations in railroad work. While these photographs are by no means intended to depict the full range of makes or models available, or to illustrate all the possible applications, they are representative of the machines on the market and of their potential field of usefulness in carrying out railway maintenance operations.

Introduction to

A Dynamic Equipment–Replacement Policy



A formula has been developed and is being widely used in industry today which reduces to specific terms all factors involved in determining whether the replacement of a particular machine with a new unit is economically justified. With the thought that those responsible for the replacement of maintenance-of-way work equipment might find this formula of help in solving their problem, its theory is outlined in this article.

• What policy is followed on your road in determining when to replace particular units or groups of maintenance-of-way work equipment? The probability is that rule-of-thumb methods are used, which perhaps take into consideration the cost of the new machine, its reduced cost of maintenance and operation as compared with the old one, and maybe a few other factors such as the salvage value of the old machine. Having decided, on the basis of these factors, or perhaps on judgment alone, that a new piece of equipment should be purchased the proposed machine is added to the equipment budget from which it may or may not be lopped off—depending on the judgment of somebody higher up.

Many maintenance officers recognize that there is need for a more systematic approach to the problem, which will take into consideration all relevant factors, including those that may now be considered intangible, and which, as the end result, will give a definite dollars-and-cents answer to the question as to whether it is economical to replace a particular unit. The likelihood is that requisitions for new equipment, if determined on the basis of such a formula, would carry greater weight with management than the rule-of-thumb methods now used, especially if it could be shown that the formula had been developed under authoritative auspices and that it was being widely used in industry generally.

Actually such a formula is available today. It is known as the MAPI formula after its sponsoring organization, the Machinery & Allied Products Institute. While it was developed primarily as a guide for use in determining when machines in manufacturing plants should be replaced, there is no reason why the formula cannot be applied to at least the larger units of maintenance-of-way work equipment, such as ballast cleaners, cranes and large tamping machines. In this article an attempt is made to outline the basic principle of the formula and the manner of its application. For the benefit of readers who may desire to go more deeply into the subject sources of additional information are given in an accompanying box.

"Operating Inferiority"

With almost any machine the effect of deterioration and obsolescence is, with use and the passage of time, to open a gap between the operating performance of a machine in service and the performance available from its best current alternative. In the MAPI formula this gap is called the machine's "operating inferiority." With the existing machine the operating inferiority is obviously a value based on a comparison of the performance of the machine in service with that obtainable from the best current alternative. For new machines the operating inferiority is calculated on the basis of an assumption which will be discussed later.

To the operating inferiority of the machine, whether old or new, is added a factor representing capital cost. When determining whether it is economical to replace an old machine with a new one the objective is to find, for each machine, the combination of operating inferiority and capital cost which minimizes their sum. This figure is known as the machine's "adverse minimum". The purpose of replacement analysis by the MAPI formula is the computation and comparison of these adverse minimums. Replacement of a machine is held to be economical when its adverse minimum is greater than that of a new unit. In other words, the premise of the formula is the conviction that the object of a replacement policy

How to Get More Information on the MAPI Formula

A detailed explanation of the theory and practice of the MAPI formula has been incorporated in a full-length book entitled "Dynamic Equipment Policy," by George Terborgh, research director, Machinery & Allied Products Institute, which has been published by the McGraw-Hill Book Company. For the benefit of interested persons who may desire to familiarize themselves with the principle elements of the formula without the necessity of studying this comprehensive volume, these have been summarized in a smaller book entitled "MAPI Replacement Manual." Copies of the book ($4.50) and the manual ($4.00) may be obtained from the Institute, 120 South LaSalle Street, Chicago.

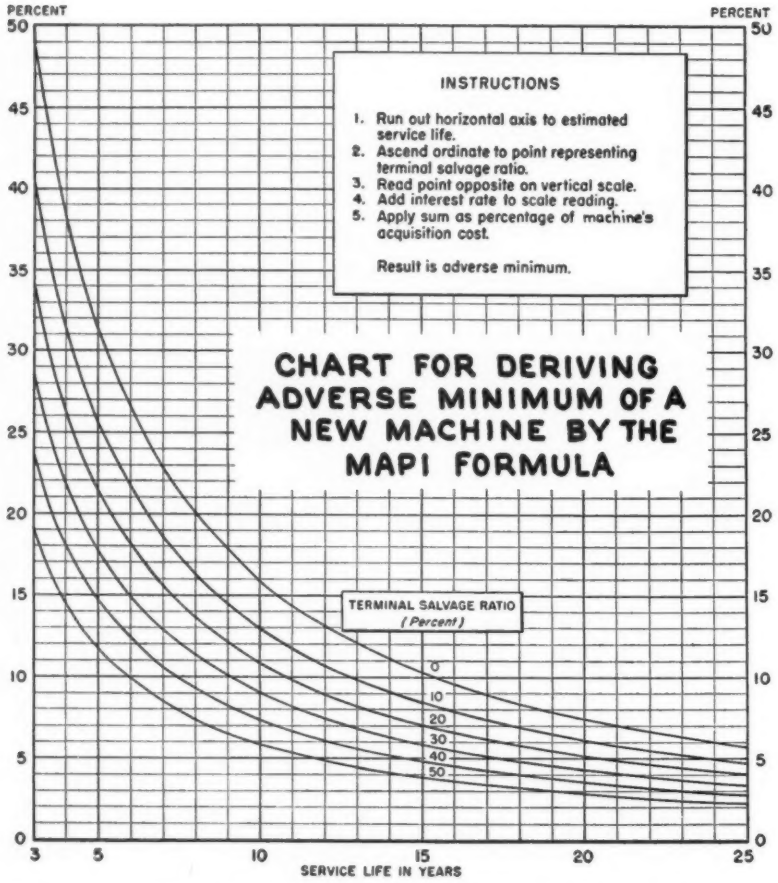


Fig. 1—An example of the method of using this chart to determine the adverse minimum of a proposed machine is given in the lefthand column of the opposite page

should be to minimize the sum of operating imperfection (inferiority) and capital cost.

Underlying the MAPI formula is a framework of assumptions as to the future, by means of which it becomes possible to reduce drastically the number of specific estimates required for the solution of a replacement problem. Two principal simplifying assumptions are made, one for the existing equipment and one for the proposed machine. In both cases the principal assumption is made in connection with determining the adverse minimum.

The assumption for the existing equipment is that the combination of operating inferiority and capital cost **for next year** will give the adverse minimum. This assumption is based on the reasoning that by the time a piece of equipment is old enough to be the subject of a replacement analysis it is usually safe to assume that its operating inferiority relative to the best present and future alternatives will rise with time faster than the capital cost of keeping it in service (if any) will fall. If so, it follows that the sum of both factors for next year will be lower than the best average for any longer period.

While it is considered permissible to compute the existing machine's adverse minimum from estimates for next year only, the comparable calculation for the new machine will run far into the future. In other words, although the new machine has at present no operating inferiority, it will acquire inferiority in the future as it deteriorates in service and as improved alternatives are developed. Since it would obviously be impossible to predict precisely the manner in which a machine will be affected year-by-year by deterioration and obsolescence it is assumed—and this is the principal simplifying assumption for the new machine—that a unit of new equipment will accumulate operating inferiority at a constant rate.

This assumption not only simplifies the problem of determining a new machines' operating inferiority but it also makes possible a comparatively simple determination of the lowest annual average of inferiority and capital cost obtainable by use of the new machine; that is to say, its adverse minimum.

Finding the Adverse Minimum

Since the object of replacement analysis is to find out whether the new machine offers a lower average of operating inferiority and capital cost than is obtainable by further retention of the old machine, it consists, obviously, of two separate calculations, one for each side of the comparison, which are performed independently. First we will consider the procedure followed in making the calculation for the existing machine. This consists of determining its next year's operating inferiority to the new machine, and the capital cost (if any) of carrying it for another year.

In making the next-year operational comparison of the existing and new machines an attempt is made to assign definite values for every conceivable factor, including items that may not ordinarily be assumed to be intangibles. For instance, the new machine may have greater capacity, or it may be more reliable with less risk of shutdown. It is considered equally important to get a complete picture of the cost-saving factors themselves. Thus a complete analysis is made of the direct saving in labor, reduced supervisory or administrative costs, any saving in the cost of maintenance and supplies, and any difference in such miscellaneous cost items as taxes and insurance.

These various factors of advantage for each of the two machines are tabulated in two columns on a summary sheet, one for the existing machine and one for the new piece of equipment. The difference between the totals of the two columns is the net next-year advantage of the new machine. In other words this figure represents the operating superiority of the new machine over the existing unit. By the same token it is the operating inferiority of the old machine.

One thing more must be determined to arrive at the adverse minimum of the existing machine. That is its next-year capital cost. In the absence of further capital expenditures on it, the capital cost of keeping in service a facility al-

ready owned is simply the cost of foregoing the opportunity to dispose of it. For next year this cost is the sum of two elements: (1) The prospective loss of salvage during the year; and (2) the interest for the year on the present salvage value. Thus it is necessary only to estimate the old machines' salvage value now and what it will be a year hence.

Having determined the operating inferiority and next-year capital cost of the old machine, its adverse minimum is obtained merely by adding these two values.

Figuring the New Machine

Now we consider the matter of determining the adverse minimum of the new machine. Because of the simplifying assumption that this machine, if installed, will accumulate operating inferiority at a constant rate, the determination of its adverse minimum is a relatively simple matter. Four preliminary steps are necessary: (1) The selection of an interest rate for the calculation; (2) the selection of the new machine itself; (3) the estimation of its prospective service life; and (4) the estimation of its terminal salvage value (if any).

With these values at hand we are ready to derive the new machines' adverse minimum. The mathematical formula for this derivation is complex but in practice the procedure has been greatly simplified by means of a chart (Fig. 1). The use of the chart may be illustrated by an example. Suppose the new machine that has been selected will cost $10,000 and that it has an estimated service life of 12 years. The terminal salvage value has been estimated at $1,000, or 10 per cent of the cost. On the chart we run out on the horizontal scale to 12 years and then ascend to the 10-per cent terminal-salvage-ratio curve. From that point opposite on the vertical scale we read a percentage figure of approximately 11. We then add to this the interest rate for the analysis, which we will assume to be 10 per cent, thereby getting a figure of 21 per cent. Multiplying the cost of $10,000 by this percentage figure we get $2,100, which is the adverse minimum of the new machine.

To carry this example to a conclusion suppose an analysis has been made of the operational advantage of this new machine as compared with the existing unit and that this advantage (the operating inferiority of the old machine) is found to be $2,500. It is estimated further that the capital cost incident to carrying the old unit another year is $300. The sum of these two figures ($2,800) is the old machine's adverse minimum. Since the adverse minimum of the new machine is substantially lower than that of the old one its purchase is shown to be economically justified.

For use in making equipment analysis based on the MAPI formula a form is used on which the calculations are summarized and the conclusions shown. While the general arrangement of this form is pretty much the same regardless of the character of the equipment, it will vary in detail to suit particular circumstances. Many machinery manufacturers have developed forms for use by their customers in making equipment analysis. Fig. 2 is a reproduction of one of these forms and is presented here simply as an illustration of how the various values developed in a MAPI equipment analysis are assembled in arriving at the final conclusion.

The foregoing discussion is intended only as a bare outline of the substance of the MAPI formula. Necessarily it has not been possible to develop many important points to the extent required for a complete understanding of the formula. Such an understanding can be had only by a careful study of the available literature on the subject.

EQUIPMENT REPLACEMENT ANALYSIS

(As Determined by the MAPI Formula)

EQUIPMENT UNDER CONSIDERATION

PRESENT EQUIPMENT	PROPOSED EQUIPMENT
Builder	Manufacturer
Model	Model
Year	Proposal No.
Serial No.	Estimate No.
Location	Date of Proposal

ANALYSIS OF THE JOB
(MAPI — "Operating Advantage — Next Year")

FACTOR	PRESENT	PROPOSED
(1) Superiority of Product	$	$
(2) Increased Output		
(3) Other Product Factors		
(4) Direct Labor		
(5) Indirect Labor		
(6) Fringe Benefit Costs		
(7) Maintenance		
(8) Supplies		
(9) Tools		
(10) Spoilage		
(11) Down Time		
(12) Floor Space		
(13) Power		
(14) Property Taxes & Insurance		
(15) Other Manufacturing Factors		
(16) TOTAL OPERATING ADVANTAGES	$ (A)	$ (B)
(17) *Net Operating Advantage of PROPOSED Equipment (B-A)		$

ANALYSIS OF THE EQUIPMENT
(MAPI — "Adverse Minimums")

PRESENT EQUIPMENT		PROPOSED EQUIPMENT	
(18) Salvage Value — Now	$	(27) Cost Installed	$
(19) Salvage Value — Next Year		(28) Service Life	Yrs.
(20) Loss Salvage Val. — Next Year	$	(29) Salvage Value	$
		(30) Salvage Ratio	%
(20) Loss Salvage Val. — Next Year	$		
(21) Interest — Salvage Val.		(27) Cost Installed (D)	$
(22) Proration — Cap. Addition		(31) Chart %	
(23) Interest — Cap. Addition		(32) Interest %	
(24) Annual Fixed Cost	$	(33) Total % (E)	
(25) * Net Opertg. Disadvantage		(34) Annual Fixed Cost (D x E)	
(26) Annual Operating Cost (C)	$	(35) Annual Operating Cost (F)	$
(36) GAIN FROM REPLACEMENT NEXT YEAR (C — F)			$

Signed _____ Date _____

Fig. 2—Reproduction of a form that has been developed by a machine-tool manufacturer for use in making equipment-replacement analyses based on the MAPI formula

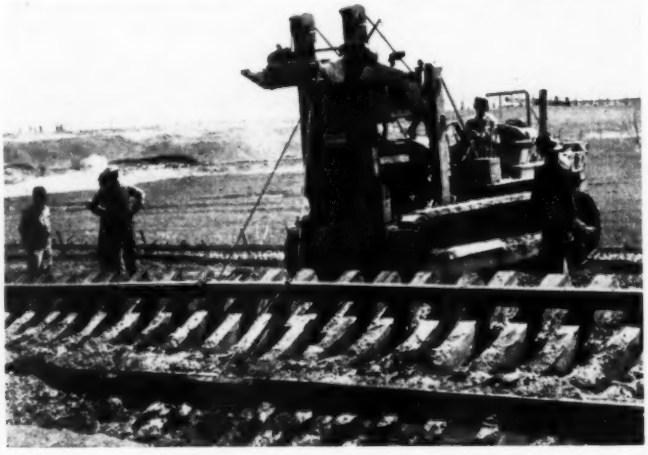
Multiple-Purpose Machines—
Attachments Add to Versatility

Wide variety of devices available for use with these mobile units has made it possible to adapt them to many different operations in the maintenance-of-way field

Left—Tractors equipped with such attachments as snow plows, rotary brooms or front-end loaders have proved their worth in snow-cleaning operations, both out on the line and around stations and yards. Shown here is a Buda-Hebard Shop Mule tractor with an Anderson straight-blade five position snow plow

Plowing fire guards along right of ways can be carried out easily and economically with an outfit such as the one shown above, which consists of a Rome disk pulled by a bulldozer-equipped Caterpillar diesel D4 tractor

Hydraulically-operated tool-bar attachments for crawler tractors permit use of such special tilling tools as the V-shaped blade shown above



Above—The utility of tractor attachments in railroad emergency work is emphasized in this picture, which shows a Traxcavator, with bucket removed, pulling track back to the roadbed after an extensive washout

Left—Equipped with a special slotted bucket that straddles the track rail, the Hough Model HF Payloader can be used effectively for removing debris from yard tracks and loading it into cars for disposal

# of Tractors

• When the tractor—whether mounted on crawler treads or wheels—is viewed as a mobile power plant, capable of negotiating almost any sort of terrain, it immediately is found to have great potentialities as a tool for the maintenance-of-way forces. However, it would still have to be regarded as having only potential value in this respect were it not for the many attachments and devices that are available for use with it. These attachments, ranging from rotary brooms to crane booms, make it possible to use a single tractor for many different kinds of work.

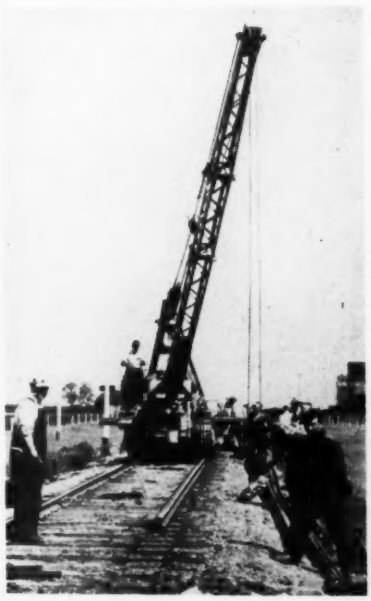
All Sorts of Work Possible

Equipped with the proper attachments tractors are ideal tools for doing all sorts of grading and material-handling work along railroad right of ways. The ubiquitous dozer blade fits into this picture in an important way, especially where there is spreading, backfilling or shaping work to be done. Loading attachments, such as those of the front-end type, have also found an important field of usefulness in this work, especially in ditch-cleaning and widening operations. Tractor-drawn scrapers or

Tractors incorporating air compressors are becoming increasingly popular with maintenance-of-way men. Shown here is a Schramm Pneumatractor, which not only can be used to furnish air for the operation of tamping guns and other pneumatic tools but also can be used as a hauling machine and for mounting various attachments

Boom attachments for use on tractors make it possible to adapt them to a wide variety of lifting operations. Shown here handling bridge timbers on a bridge job is a Caterpiller diesel D6 tractor equipped with a Hyster Hystaway attachment

Above—A tractor equipped with an Oliver Strait-Line loader which can be used either for conventional front digging and loading or for rear digging and front loading. In latter case, after bucket is loaded, it is swung over top of tractor



Right—While designed primarily for off-track work, crawler tractors can also be used in some types of on-track operations. Shown here in rail-laying service is a Caterpillar D6 tractor equipped with a crane boom and Esco track-walking shoes

For ditch-maintenance work and various other right-of-way grading operations, the Southern is using effectively this International TD-9 tractor with a LeTourneau 4-yd. scraper

This slide on the Rock Island was cleared by a crawler tractor equipped with an HT4 Traxcavator. The outfit was later used in constructing a levee to prevent future slides there

Equipped with the proper attachments, tractors are ideal tools for doing all sorts of grading along right of ways. This grading outfit, in operation on the Southern Pacific, consists of an Allis-Chalmers tractor and a two-wheel Gar Wood scraper

Bank widening on the Southern Pacific with an Allis-Chalmers HD-5G Tracto-Shovel. The controllable bucket of this unit proved particularly effective in carrying the widening material up the embankment slopes and depositing it on the shoulders

scoops are not only used for this purpose but for all other types of earthmoving work. A number of railroads have organized grading outfits, based on tractors as the hauling units, which are being used to advantage in carrying out all kinds of right-of-way grading operations. (See page 257 of this issue for details of how several maintenance grading outfits of this type are being used on the Seaboard Air Line.)

On occasion tractors equipped with winches have been used as the basis of dragline setups for cleaning out culverts and bridge openings. Tractors fitted with crane booms, in addition to other operations mentioned later, may also be used for handling clamshell or dragline buckets in all the various kinds of grading or material-handling work for which this type of equipment is suitable. A number of roads are using tractor-drawn plows or diskers for constructing fire breaks along their right of ways. A special tool-bar is available for use in such instances. One of these tool-bars is being used in the photograph that shows a drainage ditch being built by a crawler tractor pulling a V-shaped blade.

Attachments for Lifting

Crane attachments for use on tractors make it possible to adapt them to a variety of lifting operations such as the loading and unloading of ties and rails. Tractors so equipped are sometimes used on rail-laying jobs, with or without the benefit of special shoes fasten-

An International Super A wheel tractor with an International Al-23 mower at work on the New York Central near Buffalo, N. Y. Cutter bar is raised or lowered under fingertip control

Shown here digging a trench for a water main in a yard of the Grand Trunk Western at Detroit, Mich., is a Caterpillar diesel tractor with a Hyster Hystaway dragline attachment

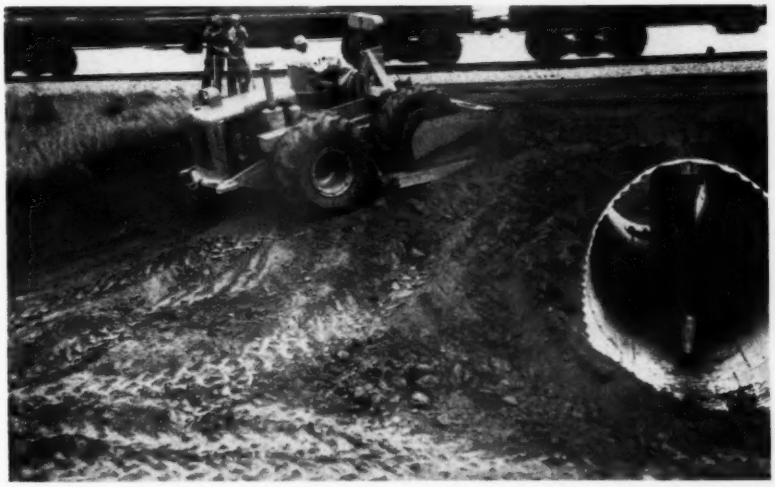
ed to the treads, by means of which they can be operated on the rails.

Tractors with various attachments have proved to be valuable machines to have available in some kinds of emergencies. Following derailments, for example, bulldozers have been used to good advantage for clearing away wreckage. These machines have also proved their worth in snow-cleaning operations, both out on the line and around stations and yards. Tractors equipped with rotary brooms, front-end loaders, and similar attachments are also adaptable for handling snow during the winter months.

Tractors incorporating air compressors are becoming increasingly popular with maintenance-of-way men. Such tractors are not only used to furnish air for the operation of tie-tamping guns and other pneumatic tools, but some of them are so designed that they can be used as hauling units and for mounting various attachments such as dozer blades and loaders.

In this brief article it has by no means been possible to mention all the various attachments that may be obtained to enhance the versatility and flexibility of crawler and wheel tractors. Neither has it been possible to include photographs of all the types and makes of attachments that are finding applications in maintenance-of-way work. However, those shown are sufficient to give an indication of the many diversified uses to which a tractor may be put, simply by providing various attachments for use with it.

Where spreading, backfilling or shaping work is to be done, the dozer blade enters the picture in an important way. Here, two International tractors with Bucyrus-Erie angle blades are engaged in cleaning and shaping ditches on the Great Western



On this project, in which a bridge was replaced by a culvert, the backfilling work was carried out effectively with a Tournadozer. This machine is fitted with a blade 11 ft. 2 in. wide by 43 in. high which can handle up to 2½ cu. yd. per trip

Spot Tampers For Section Gangs Get Results On the T.&P.

A five-year program of equipping each of its section crews with mechanical tampers pays off by enabling the Texas & Pacific to improve and maintain its tracks for higher speed operation without an appreciable increase in forces.

Above — Electric-driven tampers of the vibratory type are used in gravel-ballast territories

Left — Lifting an electric vibratory outfit, along with other track tools, from a push car

• To increase the productivity of its section men and to improve its standards of track maintenance with a minimum expenditure of man-hours, the Texas & Pacific began a systematic program in 1937 of furnishing power-tamping equipment to its section forces. By 1942 all sections with rock or gravel-ballasted track on the road had been so equipped. As a result, the railroad has been able to maintain its tracks for higher-speed operation, while at the same time increasing the lengths of the sections, and thereby reducing the number of section gangs needed. Moreover, since the advent of the 40-hr. week even greater economies have been realized.

At the present time, the T. & P. is divided into 170 sections for track maintenance, averaging 9.4 mi. in length. On the average there are six men in each section gang, in addition to the foreman. With the exception of nine sections located on branch or secondary lines that are dirt ballasted, all sections are equipped with mechanical spot-tamping machines. These spot tampers include electric vibratory-type four-tool units; pneumatic four-tool outfits, each powered by a portable compressor of the radial type; and self-contained gasoline-powered units. Nine sections were each furnished with one of the pneumatic four-tool outfits; 41 sections were each equipped with from two to four of the self-contained gasoline-powered units, and 111 sections were each furnished with a vibratory outfit.

Selected for Ballast

The selection of the type of tamping outfit for spot maintenance on a given section was influenced by the kind of ballast in use on the particular territory. While admitting that their opinion does not necessarily hold true for all types of gravel ballast, responsible maintenance officers on the T. & P. believe that, in general, the

Above—A Texas & Pacific section gang on its way to work, transporting a pneumatic spot-tamping outfit on a push car

Above — Two air-operated tamping guns being used to loosen ballast in connection with skeletonizing work

Right—A number of sections are each equipped with four gasoline-powered unit tampers

electric vibratory tamper is the most effective machine for the gravel used as ballast on this road.

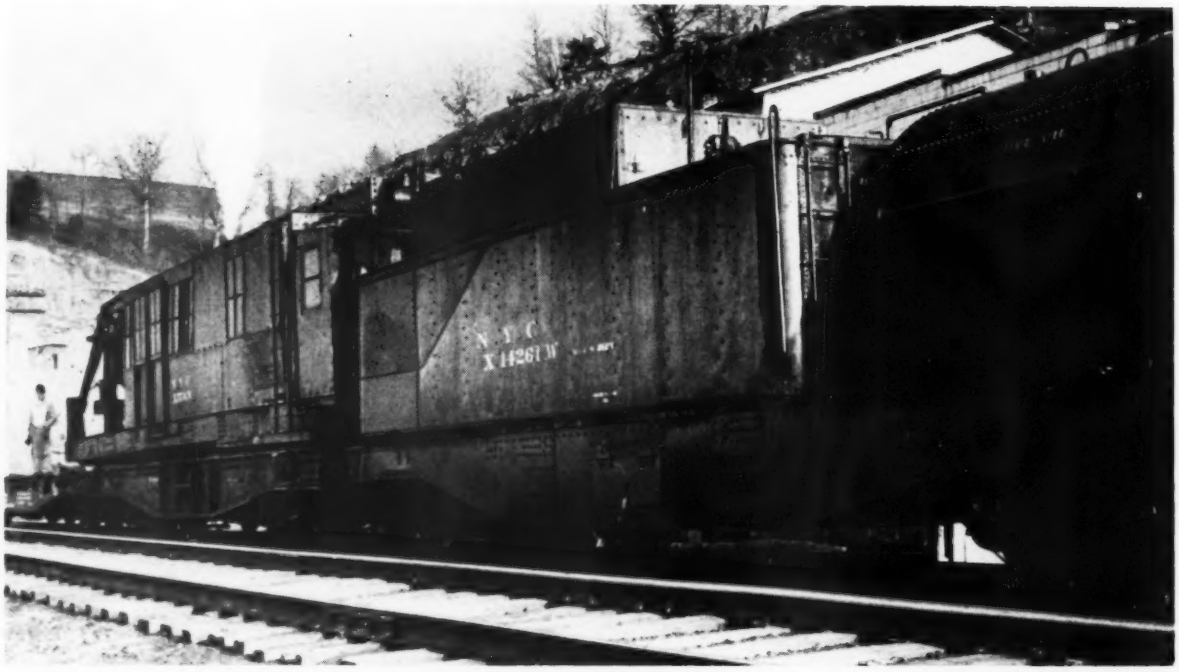
For crushed-stone ballast, size 1½ in. and smaller, the railroad found the pneumatic and the vibratory tampers to be the most satisfactory, although the gasoline-powered self-contained tampers are also considered satisfactory for this small stone. On the portions of the line ballasted with crushed stone larger than the 1½-in size, the direct-blow tampers of both the self-contained and the pneumatic types were found to be the most effective. For the larger stone ballast where the track is to be surfaced out-of-face and raised a few inches, the road has used the vibratory tampers.

Out-of-Face Surfacing

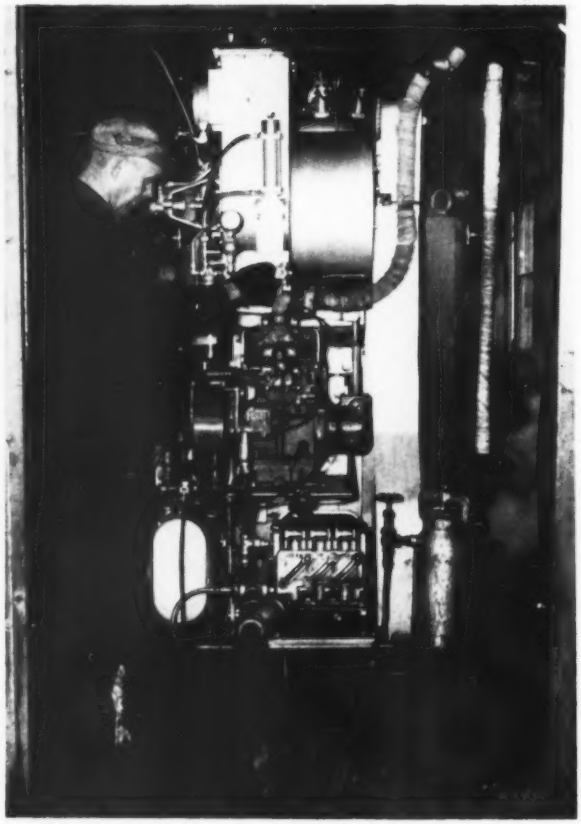
The tamping outfits that have been furnished to section gangs are used primarily for spot-tamping work. Out-of-face surfacing is performed largely by extra gangs equipped with several tamper units or with a Multiple tamper purchased in 1949.

The section foreman are responsible only for the lubrication, adjustments and minor running repairs to the tamping outfits assigned to them. An equipment maintainer, with one or more helpers, is assigned to each division. These men make periodic inspections of the tamping units under their jurisdiction and make heavy repairs. A general overhaul of equipment, if required, is authorized by the equipment maintainer, but the work is done in a shop.

Maintenance officers of the T.&P. feel that the results obtained from the mechanization of spot-tamping operations on the sections have more than justified the expenditure involved. Since the completion of the program in 1942, improved equipment has been secured each year to replace old tools that have either been worn out or become outmoded.



Recently equipped with a flash-type steam generator, the New York Central's pile-driving rig X556-W, shown above, has no trouble in moving the four-car outfit weighing 663,000 lb. up a 2.25-per cent grade from a standing start on a siding



Engineer E. S. Snyder turns only one control to put the Vapor-Clarkson Model 4635 steam generator into action. In two minutes he will have full steam pressure. Unit is compact and allows room to walk on either side of the cab. The small tank at lower right is used for the "stick" treatment of the water

Greater efficiency and important operating advantages are being realized on the New York Central by the replacement of the existing coal-fired boiler in a pile-driving rig with an automatic steam generator of the flash type.

No Waiting for S

• The first railroad pile driver to have its coal-fired steam boiler replaced with an automatic steam generator of the flash type is New York Central's rig X 556-W, now engaged in driving steel rails for embankment stabilization along the Kanahwa river between Charleston, W. Va., and Point Pleasant. The new steam generator has performed so satisfactorily and has shown such marked advantages over the former steam boiler, that the road is now engaged in converting the steam plant in another unit in a similar manner.

The new steam generator in rig X 556-W is a Vapor-Clarkson Model 4635, which is a type similar to those used to provide steam for heating diesel-powered passenger trains. It produces 3,500 lb. of steam an hour at pressures between 75 and 300 p.s.i., which is more than sufficient to supply the entire needs of the pile-driving outfit even if it were engaged in placing piles by steam jetting. These needs include steam for driving two 12-in. by 15-in. steam engines used in propelling the outfit, for driving a compressor for operating the air brakes, for lifting and turning the pile-driver leads, for activating a Vulcan No. 1 single-action steam hammer, for hoisting the piles into place in the leads, and for blowing the whistle.

A 10-ton lifting hoist on the pile driver is shown here raising a length of 90-lb. scrap rail into position in the leads

The scrap rails are used as piles in roadbed stabilization work, and are driven in the fill to pin it to underlying rock

Steam with this Pile Driver

Manned by a crew of 10 men, this pile-driving outfit is comprised of a McMyler-Intrastate pile driver; a tender car with a steel underframe, which carries a locomotive-type water tank and a fuel-oil tank; an idler flat car, also with a steel underframe, for holding the pile-driver leads and tools; and a small trailer push car carrying welding gas tanks and equipment. The total weight of this outfit is approximately 663,000 lb. The steam generator has moved it up a 2.25-per cent grade from a standing start and is capable of propelling it at a sustained speed of from 15 to 20 m.p.h. on a level grade.

Pressure Changed at Will

Since the steam generator is more compact and much lighter in weight than the steam boiler it replaced, it was necessary to install counterweights in the cab of the pile driver for balancing the hammer and driving leads. Also in the cab is a 200-gal. fuel oil tank which is refilled from the tank on the tender car after each day's work by the engineer of the rig by means of a hand pump, although daily replenishment is not essential. Water is taken directly from the tank on the tender car. Immmediately behind the generator are two steam chests which are made to operate at 250 p.s.i.; the safety valves are set at this pressure. However, the steam generator is set to cut out at 200 p.s.i. and to go on again at 175 p.s.i., and, unlike the former steam boiler, the steam pressure is maintained at 110 to 125 p.s.i. while the unit is moving from one location to another. Steam pressure can be changed by adjusting a dial.

Burning atomized diesel fuel oil, the steam generator develops full working steam pressure in two minutes from a cold start, so that delays are eliminated in getting the outfit ready and underway to the job site at the start of the working day. Steam is made only as needed. The unit operates at about 80 per cent efficiency and uses about 75 gal. of fuel oil in an 8-hr. day when driving piles. Once started, automatic controls take over, causing the unit to shut off when the predetermined steam pressure has been built up. This results in a saving of fuel and water during standby time such as while waiting for trains to pass, and during the lunch hour and overnight, requiring fewer trips to the water-supply point. Further advantages are that the unit can be blown down in five minutes for standing

in cold weather, and no watchman is needed over the week end. The cab door is padlocked at such times.

A water pump, a fuel pump, a blower and a magneto on the steam generator are driven by a two-cylinder, air-cooled Wisconsin gas engine. The water pumped to the generator is continually turned into steam so that it is not necessary to shut down work operations while feedwater is being added.

When the 200-lb. working pressure is reached, the fire is automatically shut off, but the gas engine continues to operate the water pump, and when this happens the water automatically by-passes the coils and returns to the water supply. An excessive water-pressure reading on the gage indicates that the coils are in need of cleaning, which is done by making two exterior connections and circulating an inhibited, 20-per cent solution of muriatic acid.

Since no large quantity of water is heated under pressure, there is no possibility of the unit blowing up. However, many safety devices are used to insure safe operation. The feedwater is treated by the "stick" method in a small tank mounted on the base plate of the steam generator.

The stabilization work on which the outfit is now engaged was necessitated by the installation of several flood-control dams in the Kanahwa river between Point Pleasant and Charleston, in which territory the track follows the river rather closely. These dams raised the mean level of the river and in turn caused the roadway embankment to move and settle at some locations, resulting in excessive maintenance costs. To correct this situation it was decided to drive rails into the embankment to pin it to an underlying rock shelf at a depth of 25 to 36 ft. beneath the surface.

Three rows of piling are being driven. One row is centered between the rails, while the other two are arranged 10 ft. and 15 ft., respectively, from the center of the track on the pool side of the embankment. The piles are driven 12 ft. apart in each row and those in the two outer rows are staggered. Scrap 90-lb. rails of random lengths are used for the piling and are welded together where necessary to secure penetration to or, where possible, into the underlying rock. Because the top of the rock is formed in ledges there is considerable variation in the length of the piles. The rails driven in the center of the track are cut off by an oxyacetylene torch below the bottoms of the ties, while those on the sides of the embankment are cut off slightly above the ground line so that any movement of the fill will be apparent through displacement of the rails.

The pile-driving outfit runs between the job site and the nearest siding from two to five times a day, depending upon the amount of traffic. But, with the ample and continuous supply of steam produced by the new steam generator, the rig is able to spend more time actually working than would be possible with the old coal-fired boiler.

The replacement of the old boiler with the new steam generator on rig X556-W was done under the general direction of F. H. Simpson, engineer maintenance of way, and J. C. Ryan, superintendent maintenance equipment. The embankment stabilization work is also being carried out under the general direction of Mr. Simpson, and the program was begun under the direct supervision of L. W. Moss, then division engineer at Columbus, Ohio, who was in charge of the work until his recent transfer to Cleveland, Ohio. The work is now under the supervision of K. E. Dunn, who recently succeeded Mr. Moss as division engineer at Columbus.

Above—Rails driven in the center of the track are cut off below the bottoms of ties with an oxyacetylene cutting torch

Left—The oxyacetylene equipment is also used to weld rails together where necessary to secure penetration to the rock

One of the grading outfits, complete except for the bulldozer, is shown here. The motor grader is in the background. Each outfit will handle approximately 1200 to 1400 cu. yd. of material a day

Maintenance Grading Done With Off-Track Equipment

By L. E. CONNER and J. B. GREGORY*

An important section of main-track territory on the Seaboard Air Line extends through rolling terrain where the fills and cuts have a maximum height or depth of 20 ft. After the war the road began using off-track grading gangs for maintaining the right of way in this territory. The equipment used by these gangs, the personnel required and the procedure used are described herein.

• Right-of-way grading work, including the cleaning of cuts and the restoration of fills, is being done to good advantage on an important section of the main line of the Seabord Air Line by several company-owned grading outfits consisting of off-track equipment. Composed primarily of crawler-tractor-drawn scrapers, bulldozers and motor graders, two of these outfits have been in service for about four years. So satisfactory has been the experience with them that a third outfit is now in the process of being assembled.

Used in Rolling Country

The Seaboard's line extending from Richmond, Va., to Hamlet, N. C., passes through the easterly edge of the Piedmont section where the country is given to rolling hills and valleys. As a result, the grade runs through a series of medium-to-low cuts and fills, generally under 20 ft. at the point of greatest height or depth as the case may be. For many years it has been the practice to clean out the cuts and "flush" the fills using on-track equipment, generally consisting of ¾-yd. Diesel-operated ditching machines working in tandem and handled in work-train service. Following years of handling the situation in this manner, the cuts have, in many instances, been set back out of reach of that type of equipment. Another difficulty is that the traffic density in the territory is the highest on the Seaboard, with the result that the use of work trains would be extremely expensive and in addition could cause serious traffic interference.

During the war years, because of the traffic density and the labor situation, it was not possible to do the required amount of roadbed restoration work in this territory and as a result a considerable amount of such work accumulated. To cope with the matter and to restore the roadbed in the most economical manner, and at the same time to improve the situation with respect to the mowing of the right of way with machines, it was decided to organize a grading force, using off-track equipment, which would do the work without interfering with the movement of traffic. It was also decided that, where practicable, the slopes would be flattened, the roadbed widened and runoff improved.

After looking into the situation, it was decided that the work could best be handled using crawler tractors equipped with bull blades and scraper pans. Accordingly, such a force was organized. A grading supervisor, who reports to the roadmaster on whose district

*Mr. Conner is supervisor work equipment of the Seaboard Air Line, Hamlet, N. C., and Mr. Gregory is assistant division engineer at Raleigh, N. C.

The motor graders shape ditches and side slopes in cuts. On fills they are used to shape slopes and level top surfaces

The tractor-scraper outfit shown above is hauling material from a borrow pit to widen the shoulders of an embankment

When nature of terrain will permit, motor graders are used to level right of way to facilitate operation of mowing machines

he is working at the time, was appointed to be in over-all charge of the work. As stated, the force consists of two grading outfits, with a third now being assembled. The personnel assigned to each outfit consists of a lead machine operator, five machine operators, three machine oilers, and one cook. These men are housed in modern outfit cars reconstructed from tourist sleeper cars acquired secondhand from the Pullman Company. These cars are parked on tracks close to the work location; generally temporary tracks are laid down for this purpose to avoid the necessity of switching the cars.

The equipment assigned to each gang consists of four crawler-mounted tractors equipped with bull blades and scraper pans, one motor grader, and one crawler tractor equipped only with a bull blade. In one gang, the tractors with pans are International Model TD-18A machines, while the other outfit is equipped with Caterpillar Model D-6 tractors. Each gang has an Allis-Chalmers HD-7 tractor equipped with bull blade, and a Galion Model 102 motor grader. When the special nature of the work requires it, a ¾-yd. dragline is used with one of the gangs to assist in the work; however this machine is not regularly assigned to these outfits. A 1½-ton stake-body truck is assigned to each force to handle men, lubricants, fuel and other material to and from the site of the work. Also a Rogers low-bed trailer and a Diamond T 5-ton truck-tractor are assigned between the two forces to move the equipment on highways when necessary.

How the Work Is Done

The first step in the application of these gangs to stabilize the roadbed and improve the drainage is to bench the fill, starting at the top of the slope and using the tractor equipped with the bull blade. The entire fill is benched a sufficient width, approximately 10 ft., to accommodate the tractors and pans. The depth of the bench varies with the cut and the leanness of the fill, and in extreme cases may be as deep as 8 ft. below the roadbed. In some cases it is necessary on extreme-

All four hauling units of an outfit working on a fill. Maximum economical haul on the S.A.L. is considered to be 1200 ft.

ly high fills to start benches nearer the toe of the slope to obtain a uniform slope, to provide protection for personnel and equipment, and to allow maximum spread at the top of the fill.

The cut is next prepared for the removal of dirt by cutting off vegetation with the bull blade. Scraper pans are then loaded in the usual manner with material in the cut and hauled out for deposit on the fill, care being exercised to deposit the material in thin layers. Where necessary, the tractor equipped with the bull blade is used in pusher service. The movement of the equipment over the fill has been found sufficient to compact the materials when spread in thin layers, obviating the necessity of using a roller.

As the work progresses, the motor grader is used to shape and cut the fill. In addition to exercising general supervision over the work the lead operator generally mans the motor grader. After the fill has been built to the required height, the motor grader levels off the top of the embankment and shapes the berm. This unit is also used to shape the ditches in the cut. When the nature of the terrain will permit, the motor grader levels up the remaining portion of the right of way so that rubber-tired tractor-type mowing machines may be used to control vegetation. On low fills, when adjacent material is available, a bull blade is used to push the materials against the fill after which the site is leveled with the motor grader.

Haul and Borrow

In the grading operations conducted on the Seaboard it has been determined that, for the needs of that road, the maximum economical haul is 1200 ft. The amount of earth moved in any one operation is determined by the length of haul involved, and in many instances it has been found economical to purchase borrow adjacent to the line rather than to run 1000 ft. additionally to get material located on company property. In the type of rolling country in which the equipment has been used to date, it is frequently possible to work out of two adjacent cuts onto an intermediate fill, which has the effect of materially reducing the turn-around time.

Each outfit of off-track equipment, in the type of country described, will handle approximately 1200 to 1400 cu. yd. of material a day, depending on the type of soil, the length of haul, and weather conditions. On-track equipment formerly used in this same territory moved approximately 400 cu. yd. a day. This outfit was handled by a steam engine and, in addition to a regular train crew, had two machine operators, one machine oiler, two laborers, and a cook assigned. The off-track equipment is handling approximately four times the yardage that the on-track equipment handled, at approximately one-fifth the cost per cubic yard.

After several years of handling roadbed restoration work in this manner, the Seaboard has found that off-track gangs of this type provide the most economical method of stabilizing and restoring roadbed on its lines running through the Piedmont section and other locations where borrow is available and where the height of the fills and the depth of the cuts are not extreme.

In the maintenance of the grading equipment, the operators are responsible for the replacement of ripper teeth and cutting blades, adjustment of the clutches and brakes, tightening and lubricating the equipment, and keeping it clean. Running repairs are performed by the system roadway mechanic assigned to the territory where the gang is working. These mechanics are equipped with a van body truck which carries tools and supplies necessary to do the work. The trucks are equipped with a generator operated by a power takeoff from the main engine, which generates power used in operating such tools and machinery as small lathes, valve grinders, bench grinders, and other equipment carried on the truck.

When major repairs are required, or a general overhaul is needed, the machine is shipped to the system roadway shop located at Hamlet, N. C. This shop is equipped with modern machinery and skilled personnel for prompt and economical repair to all roadway equipment. The roadway shop and the system roadway mechanics are under the supervision of the Supervisor Work Equipment, who is responsible for the maintenance of all roadway machinery.

Interior of one of the bodies at right

The Lehigh Valley prefers vans of the type shown here. The road has five of them

Special Bodies

Make Repair Trucks Into "Shops on Wheels"

Adequately equipped highway vehicles, in several styles, are proving effective tools in hands of work-equipment repair forces

• By providing field mechanics with comfortable transportation, space to carry necessary tools and equipment, and in some cases, clean, comfortable places in which to work, several railways are increasing the efficiency of their machinery repairmen and are helping them to do the best possible job of "preventive maintenance". These trucks—by making repairmen virtual "Johnnies on the spot" who thereby reduce or eliminate out-of-service delays—are contributing to greatly increased production of all maintenance gangs using equipment.

A survey conducted by **Railway Engineering and Maintenance** among supervisors of work equipment indicates that three types of body are in greatest demand for this service. The most popular is the so-called "telephone" type, modeled after the compartmented pick-up body used by commercial telephone linemen. Some roads use the panel-delivery type body, while a few prefer the more elaborately-fitted van type. Other roads have designed their own bodies to suit the particular requirements of their organizations and equipment ownership.

Pick-up Body Often Used

Typical of the "telephone" type body is that used by the Southern. According to V. W. Oswalt, assistant superintendent of scales and work equipment: "This body, mounted on a ¾-ton chassis, has proven extremely satisfactory both as an investment and for practical use. The repairmen to whom this type is assigned have the advantage of ample storage room for small parts, bolts, etc., as well as units such as carburetors, magnetos, spark plugs, piston assemblies, and connecting rods. He has a clothes locker with room for a traveling bag. He has other compartments for tools suited to his work. Finally, all compartments are weatherproof and locked."

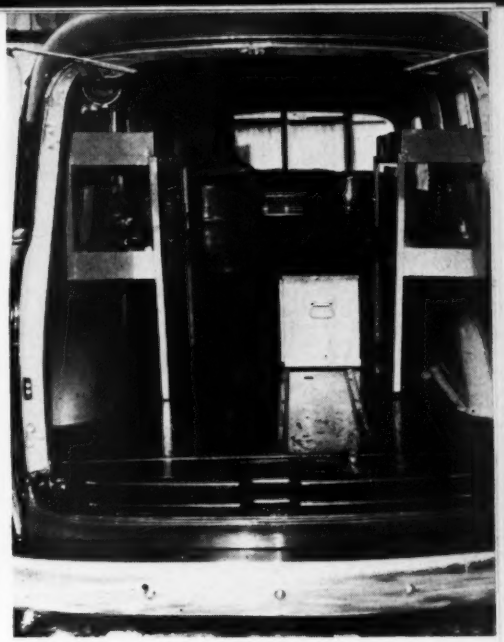
Between the compartments, which are arranged along each side of the truck behind the cab, there is floor space for hauling small portable machines, such as rail drills and power wrenches. This floor space is usually about 4 ft. by 7 ft. and may be either open or have a closed top. On the Southern, traveling roadway mechanics using these trucks are equipped with enough good hand tools to meet all their needs. These tools vary from screw drivers and a complete set of 12-point socket wrenches to a portable electric generator of 1250 to 1800 watts capacity.

According to Mr. Oswalt, the use of repair trucks equipped in this manner "boost the morale of roadway mechanics, making them more efficient workmen. Their high morale and greater efficiency is soon reflected in better-conditioned equipment of higher availability".

Panel Type Also Popular

One of the simplest bodies used on equipment-repair trucks is that of the panel delivery type. This body is best exemplified by the seven trucks in use on the Boston & Maine exclusively for its work-equipment division. These bodies are mounted on ½-ton chassis and all have rear doors. The interiors are equipped with cabinets and open cupboards to hold small parts

Panel-type bodies such as this are favorites of repairmen on the Boston & Maine



The B. & M. panels look like this inside

and special tools. Sufficient floor space is available in the center of each body to carry fairly heavy and bulky materials such as motor-car wheels and axles or entire machines such as generators, or rail grinders.

Some of the special tools with which each of these trucks is equipped include a ½-in. electric drill, a small vise, valve and valve-seat reconditioning tools, an electric-wire terminal kit and a radiator hose-clamp kit. Electricity for driving drills and other tools is usually available at freighthouses or other stations. Where stationary power is unavailable for such purposes, current is generally obtained from the closest Jackson four-tool portable generator. One of the B.&M. trucks is assigned to the system equipment repair shop for which it works full time.

According to C. L. Fero, supervisor of work equipment: "The use of highway trucks by the work-equipment division has resulted in considerably less out-of-service time for M/W machines, including cranes, shovels, spreaders, etc., and they have certainly proven effective tools."

The Van "Shops on Wheels"

In territories that are not too thickly populated and where shops and enginehouses are widely separated, the van-type, well-equipped repair truck finds its greatest usefullness. In this type of truck body, a repairman has "everything at his finger tips"; he can work in comfort in almost any kind of weather; but even more important, he can perform any repair work necessary on M/W equipment. These trucks are "shops" in almost every sense of the word.

Some of these bodies are custom-built but fitted with compartments and benches tailored to individual railway standards. Others can be purchased complete with shop equipment installed.

The Lehigh Valley is providing highway-track chassis with some of these custom-built bodies for the exclusive use of its roadway mechanics. Each chassis is a standard one-ton unit except that the steering mechanism and operating controls are placed at the extreme forward end of the chassis frame.

Each special body has its windshield and dash in front of the engine, each has an even floor from the engine compartment extending to the rear end, and sufficient headroom to allow a man to stand erect inside at any point. The only depression in the floor is located immediately adjacent to each side door to provide a step when getting in or out of the truck. Being built as wide as possible, these bodies allow the installation of a work bench on one side and bins for repair parts and material on the opposite side—both the bins and work bench extending from the side door to the rear end.

The lower section of the bin compartment, 96 in. long, 22 in. deep and 33 in. high, is divided into 15 equal-size bins for the heavier and larger repair parts and working tools. The upper section, 96 in. long, 14 in. deep and 27 in. high, is divided into 30 equal-size bins for the smaller repair parts, carburetors, magnetos, fuel pumps, and many other items which do not require much space.

Sheet-metal trays have been made to fit into some of the smaller bins to provide space in which to carry small bolts, nuts, washers, cotter pins, etc. This saves considerable time when such items are required quickly. The benches placed in each unit are 33 in. high, 25 in. wide and 108 in. long. Their height is the same as the lower-bin compartment. Each bench is equipped with two built-in drawers located near the front end for the mechanic's miscellaneous tools. The arrangement and size of the bin compartment and benches provide an aisle 25 in. wide as well as easy access either from each side door or the door in the rear of the truck body.

The only seat installed in these trucks is the driver's seat which is adjustable and hinged at the floor so that it can be moved forward out of the way when entering or leaving through the left door.

Major Equipment

The major equipment installed in these units consists of a 1500-watt, gasoline-driven generator; a garage-type, electrically-driven air compressor; a ½-in., portable, electric drill; a 6-in., electric, portable grinder; a bench vise; and a portable floodlight.

The generator is mounted under the bench at the rear righthand corner of the body and furnishes

This van body was built for a railroad by Eastern Body Company, Philadelphia

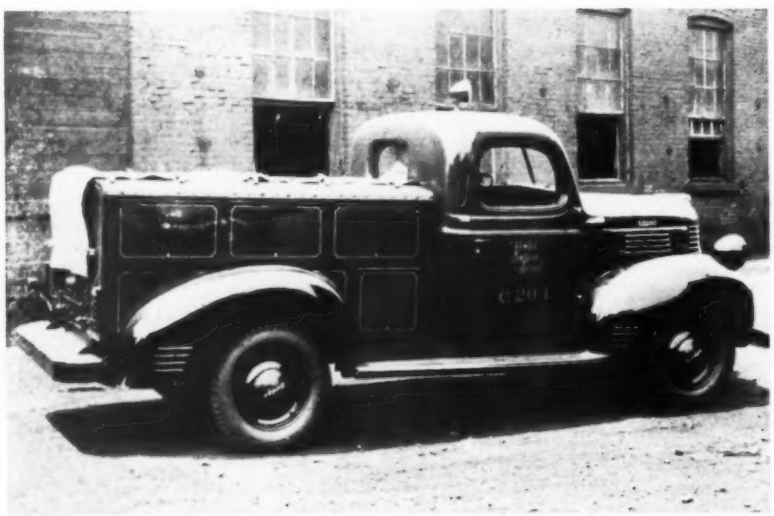
electric power for the portable tools and the air compressor located under the bench at the opposite end near the right-side door. The drill and grinder are mounted on stands on top of the bench near the rear end, while the vise is mounted at the front corner of the bench, thus leaving a generous amount of space on top of the bench for a mechanic to work.

Electric Outlets Provided

Electric current outlets are provided so that the portable tools can be "plugged in" and used inside the truck. The air compressor is controlled by a permanently installed switch under the bench. Extension cords are provided so that the portable tools and floodlight can be used outside the truck within the range of these cords. Sufficient outlets are provided so that the floodlight and portable electric tools can be used simultaneously. Six-volt lights are mounted over the bench for use when the mechanic is working inside at night.

Other tools provided include gear pullers, reamers, air hose with nozzles for inflating automotive-vehicle tires, cylinder hones, soft hammers, pinch bars, tachometers, motor-car wheel pullers, special socket wrenches, special open-end wrenches, cylinder vacuum and pressure gauges, battery testers, inside and outside micrometers—in short any small tool which will provide the means to test, adjust, or repair a machine to prevent long delays in operation on line.

"Telephone"-type pickup bodies are popular with the repairmen on the Southern



The New Haven fabricates its own pick-up bodies and mounts them on ¾-ton chassis

Features of Van Bodies

According to W. E. Kropp, supervisor of work equipment on the Lehigh Valley, these vans were chosen as the most suitable body for work equipment repair forces because they provide:

(1) "Sufficient space to carry the necessary tools, equipment and repair parts required for testing M/W work equipment to determine the extent of defects, make necessary adjustments, and replace defective parts while the machine is still in operating condition to prevent a major breakdown.

(2) "Sufficient repair parts, tools and equipment to protect the mechanical equipment in the territory, including the special units which are moved into and out of the territory at infrequent intervals.

(3) "A well-lighted, comfortable, fully-enclosed space in which to work during inclement weather. This requires a heater for winter use".

Pointing to the following accomplishments of these trucks as an indication of their worth, Mr. Kropp continues: "Frequently, complete assemblies such as carburetors, magnetos, starters, generators, distributors, cylinder heads, gear cases, and many other parts can be removed from a piece of machinery and taken inside the truck for repairs, either because of rain, snow, extreme temperatures, or to provide a clean place to work. Above all these are the best means I've found to accomplish 'preventive maintenance'. Believe me, I'm satisfied".

PRODUCTS OF MANUFACTURERS

New, improved equipment, materials, devices

(For additional information on any of the products described in these columns, use postcards, page 211.)

TIE INSERTER

LAST year Fairmont Railway Motors, Inc., Fairmont, Minn., introduced a machine for removing the old ties in connection with tie-renewal work. The company has now announced a companion machine, known as the W69 Series B tie inserter, for pulling the new ties into place under the rails. In performing this operation the new machine—an on-track unit—utilizes a cable, both ends of which are fastened to a drum. After the machine is clamped to the rails, the middle loop of the cable is hooked around the far end of the tie. Power is then applied to the drum and the tie is drawn into place.

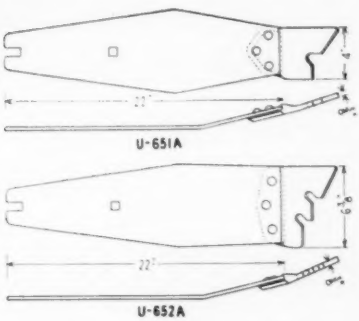
Before the pull is made, however, the near end of the tie is fitted with a nose plow and the far end with a shoe. Each plow is equipped with a socket which slips easily over the end of the tie. Three plow sizes are available to fit variations in tie dimensions. The tie shoe is clamped to the other end of the tie with the aid of a hand wheel, and can be adjusted to fit any size of tie. The shoe is grooved to hold the cable in place and is equipped with a handle for the convenience of a workman who guides the tie as the cable pull is made.

The cable drum is driven by a reversible hydraulic motor through a differential gear-type speed reducer and a jaw clutch. A two-cylinder, four-cycle air-cooled engine drives the hydraulic pump. The machine moves from tie to tie on double-flanged wheels actuated by hydraulic rams. The rail clamps are also actuated by hydraulic rams. While the tie is being pulled, three rollers under the machine help to guide it into position. One of the rollers, the middle one, also acts as an idler drum for the cable. The cable passes from the power drum down around the roller and then out under the rail to the end of the tie. Practically a straight line pull is thus provided.

The machine is equipped with three manually-lowered set-off wheels for use when the machine must be removed from the track. It also has large eye-bolts for lifting if a crane is available. When the machine is set off between crossings an anchor chain is hooked to the rail to prevent it from running too far down an embankment. With the cable anchored to the far rail, the machine can easily pull itself back to the track.

BLADES FOR ELECTRIC TAMPERS

THE Electric Tamper & Equipment Co., Ludington, Mich., is now offering two new tamping blades, both applicable either to the manually-operated Jackson vibratory tie tamper or the Jackson Multiple tamper. One of these, known as the U651A, has a tip 4 in. wide by ⅜ in. thick, and is designed particularly for smoothing



and spotting in connection with surfacing operations where the track is raised very slightly or not at all. It is reported to be highly efficient in all types of ballast.

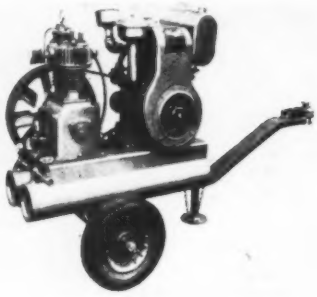
The other new blade, known as the U652A, has a tip 6⅝ in. wide by ⅜ in. thick. It is a combination smoothing and tamping blade and is reported to be especially useful in the lower track-lift ranges.

PORTABLE COMPRESSORS

A NEW line of trailer-mounted air compressors for operating paint-spray guns, chipping hammers, light paving breakers, spaders, tampers and similar pneumatic tools has been developed by the Gardner-Denver Company, Quincy, Ill. Each compressor is driven

For additional information on any of the products described on these pages, use postcards, page 211.

through a V-belt by a gasoline engine. The trailer of each unit is mounted on two roller-bearing wheels with semi-pneumatic tires



and is equipped with a drawbar, trailer hitch and stabilizer leg. The compressors are available in three different sizes.

SNOW PLOW ATTACHMENT

JARI Products, Inc., Minneapolis, Minn., has announced that its Model E Jari Junior power scythe can now be used for snow removal in

the winter by replacing the sickle bar with a snow-plow attachment The plow consists of a scoop which picks up the snow and a rotary rake which chews it up and casts it to one side. The plow cuts a 16-in. swath at a time.

YARD CLEANER

THE Nordberg Manufacturing Company, Milwaukee, Wis., has announced the DSL Yard Cleaner —an on-track machine that efficiently and economically removes debris and dirt from tracks and uniformly grades shoulders and intertrack areas, all in one operation. The key to the cleaning action of the machine is a high-speed impeller made of wire-rope cables. As the impeller rotates, the material lying on the ties is swept by the cables to two cross conveyors which carry it to a waste conveyor. The cleaning action of the cables is reported to be so thorough that the tops of the ties and spike heads are completely exposed. And this is done without damage to the ties. The material in the intertrack is fed to the impeller by two ingathering plows.

The waste conveyor has a swing of 180 deg. horizontally and its discharge end can be raised or lowered as necessary. The waste material can either be discharged into dump-body push trucks ahead of the machine on the same track, in which case the machine pushes the cars as it loads them, or it can be discharged into cars up to 10 ft. in height on an adjacent track.

The DSL Yard Cleaner is powered by a 50-hp. gasoline engine which drives the impeller directly and also provides power for the hydraulic pumps and motors driving the conveyor system and the propelling mechanism. The machine can be removed quickly from the track by means of a hydraulically-operated run-off device.

INDUCTION DETECTOR CARS ARE IMPROVED

SPERRY Rail Service, Danbury, Conn., has announced that all the units in its fleet of detector cars are now giving a 200-per cent better performance in detecting transverse defects in those sections of rails extending from 0 in. to 12 in. from the ends of joint bars. The improved performance is due to improvements in all components of the cars plus the addition to each car of a new multi-unit electronic device which gives the operator a visual aid in interpreting the indications received on the tape while testing through joints.

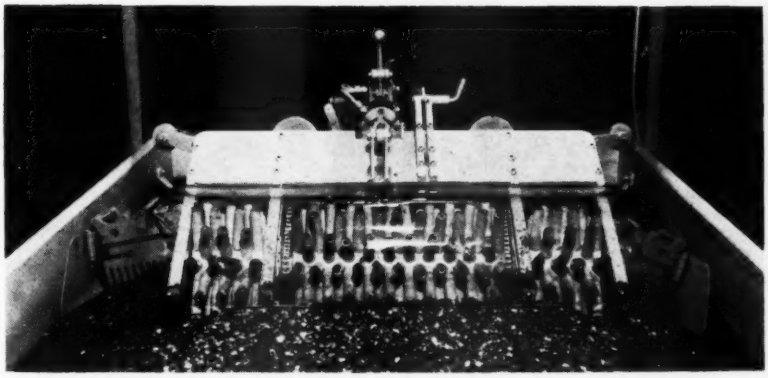
HEAVY-DUTY POWER SHEAR

A POWER shear for brush-clearing and heavy grubbing work, which is reported to be capable of cutting cleanly a 2-in. hardwood branch with one stroke at a rate of 25 cutting strokes a minute, has been announced by the J. T. Henry Company, Hamden, Conn. Known as the No. 500 "Silver Giant", the unit is powered by compressed air with a pressure of 125 p.s.i. It consists of an aluminum-alloy shaft with tempered-steel cutting jaws at one end and

an air-line connection and operating trigger at the other. The shear is available in lengths ranging from 3 ft. to 10 ft. It is also available with completely insulated fiber-glass shafting, if desired.

IMPROVED UNIT TAMPER

THE Racine Tool & Machine Co., Racine, Wis., has made a number of design changes in its unit tie tamper. An entirely new carburetion system has been added which assures simple carburetor adjustment and easy engine starting; the guards formerly employed to protect the engine are no longer needed; and the weight of the unit has been reduced to about 55 lb.



POWER TRACK DRESSER

THE Power Ballaster Products Division of the Pullman-Standard Car Manufacturing Company, Chicago, has announced a self-propelled machine for sweeping and dressing track which, the company reports, will accomplish as much work as at least six men with hand tools. The machine consists of a cylindrical broom suspended beneath a steel frame with four flanged wheels, and two oscillating shoulder rakes, one on each side. The broom consists of a cylinder studded on its outside surface with short lengths of hose.

As the machine moves along the track, a chain drive rotates the broom, sweeping all ballast from the tops of the ties. At the same time the shoulder rakes move back and forth across the ballast, scraping excessive ballast from the high spots and filling in the low spots to give the shoulders an even contour. Small following plow-like attachments on each side line and dress the toe of the shoulder. The broom can be raised to clear crossings, turnouts, etc., and the rakes may be adjusted to meet various shoulder-contour specifications. Although designed specifically to follow up the Power Ballaster, the machine can be used as well behind other types of tampers.

IMPROVED IH TRACTORS

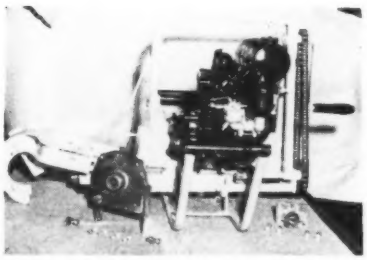
THE Industrial Power Division of the International Harvester Company, Chicago, has increased the power ratings of four of its crawler tractors, namely the TD-9, the TD-14 A, the TD-18 A and the TD-24, and has also made a number of other improvements in them.

The TD-9 is now rated at 40.8 hp., the TD-14A, 65.9 hp., the TD-18A, 89.29 hp., and the TD-24, 148.4 hp. All the machines incorporate improvements in their combustion systems and all have new operator's seats of a material which stays cleaner, won't absorb grease or oil, and offers greater comfort. In addition the TD-18A and the TD-24 are both equipped with a new full-flow oil filter which filters all oil used to lubricate the main bearings.

For additional information on any of the products described on these pages, use postcards, page 211.

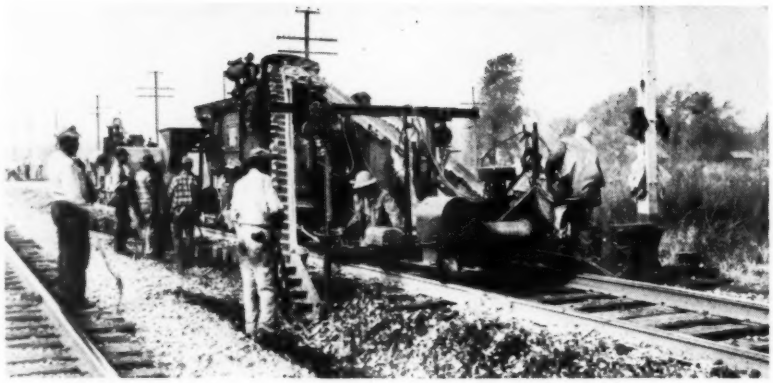
IMPROVED TRACK DRILL

THE Buda Company, Harvey, Ill., has made a number of improvements in its power track drill. A feed-screw stop has been added at the back end of the drill and a collar has been added to the spindle to limit both the forward and backward travel of the feed-screw, thereby eliminating the possibility of feed-screw damage. Also, the spindle and feed-screw are now made of a heat-treated, high-tensile alloy steel which resists



wear, and the spindle is supported on Oiltite bearings, which eliminate the need for lubrication of this part.

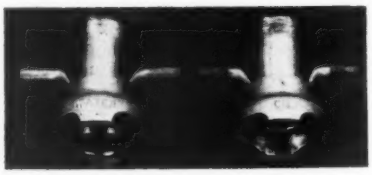
In addition, the front of the reduction-gear housing has been changed from a die casting to a fabricated and welded unit with a steel trap bolted to the drill frame for additional support. The purpose of this improvement is to reduce the possibility of damage resulting from improper feeding of the drill. A conversion kit is available which permits changing over Buda power track drills now in use.



IMPROVED BALLAST CLEANING MACHINE

THE Matisa Equipment Corporation, Chicago, has announced that a number of changes designed to improve performance have been made in the Matisa ballast cleaner. This machine is a large on-track unit which, by means of a continuous excavating chain threaded beneath the track structure, together with a series of conveyors and screens, digs, elevates and screens the ballast, returning the clean stone to the roadbed and disposing of the dirt.

In making the design changes in the machine, the hoist truck was reinforced and the diameter of the four truck wheels was increased, a safety clutch was added to prevent hoist-cable breakage in case of overloading; a rewinding device for the hoist cable was installed; the hoist control system was improved; a safety clutch for the movable crossbeam spindle was added; the lifting screws for the lower digging chain drive were reinforced, the digging-chain guides were made stronger; the digging chain was reinforced and the chain links were provided with many sharp cutting edges; the diameter of the digging-chain sprocket on the turret was increased to provide longer wear; a more efficient overload safety clutch was added to the digging chain; the capacity of the digging-chain motor was increased to 60 hp.; the design of the turret gear and shafts was simplified; the dirt conveyor was provided with a hand winch which permits raising or lowering the conveyor while in operation; the screening surface was increased from 40 to 60 sq. ft.; the rating of the traction motor was increased from 20 to 30 hp.; and a new set-off device was provided.



COUPLINGS FOR SERVICING DIESELS

THE Railroad Products Company, Cincinnati, Ohio, has developed two couplings for servicing Diesel locomotives, one for supplying the locomotives with water and the other for supplying oil. Each of these couplings consists of a coupling head with tapered lugs, a gasket, and a tail section to which the supply hose is attached. When servicing a diesel the oil or water coupling is locked tightly to the corresponding inlet coupling on the locomotive by twisting the coupling head clockwise. No tool is required for this purpose. The couplings are so designed, it is said, that the service man using them cannot mistakenly fill the oil reservoir with water or the water tank with oil.

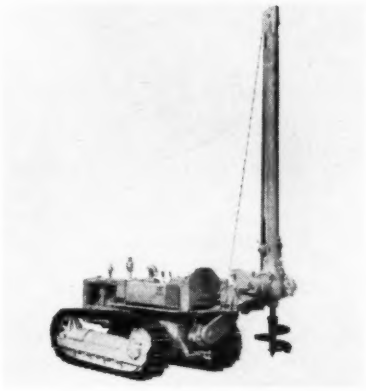
The tail section of each coupling forms a smooth passageway for the liquid and swivels freely inside the coupling head, preventing twisting or kinking of the supply hose. The gaskets form a tight seal when the couplings are locked to a locomotive. The couplings are cast from a special aluminum alloy, and are light in weight yet resistant to rough handling.

EARTH AUGER

A NEW machine, known as the Model EA4 earth auger, has been added to the line of attachments for Caterpillar track-type tractors that is made by Trackson Company, Milwaukee, Wis. The standard machine will bore holes 9 in., 12 in., 16 in., 20 in. and 24 in. in diameter to a depth of 8 ft., and is designed for drilling holes for poles, anchor holes, tower footings, and similar applications.

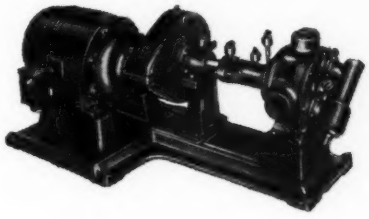
The earth auger is mounted on

a Model D4 Caterpillar tractor to permit running over rough ground and working in close quarters. The mast is raised and lowered quickly by a power winch. Both the winch and the auger are driven by a rear power take-off on the tractor, which provides two speeds forward and one in reverse. Positive chain feed puts a steady pressure on the auger bar for assuring a smooth boring action. An average hole can be drilled in a minute or less through a range of all usable angles.



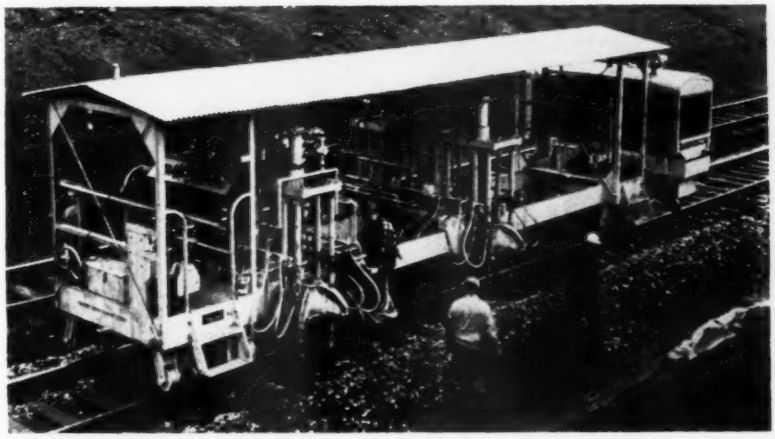
ENCLOSED ROTARY PUMPS

THE Viking Pump Company, Cedar Falls, Iowa, has announced a new series of rotary pumps for handling all types of liquids, including chemicals and petroleum products. Available in capacities of 20, 35, 50 and 92 g.p.m., the new pumps are totally enclosed with oil-tight and water-tight guards. Hence, when equipped with a totally-enclosed motor as shown in the accompanying illustration, the pumps, it is reported, can safely be used out doors in all kinds of weather without protection of any kind.



HEAVY-DUTY TRUCK CRANE

THE Unit Crane & Shovel Corp., Milwaukee, Wis., has announced a new heavy-duty truck crane, with a lifting capacity up to 20 tons and a capacity of ¾ yd. in excavator service. Known as the Unit 1520 T, the machine is mounted on a three-axle, tandem-drive crane carrier heavily-reinforced to withstand the stresses and strains of all operations. With a two-speed transfer case, the machine has 10 speeds forward and two in reverse, and can travel over the road at a speed of 30 m.p.h. The machine is equipped with air steering and air brakes.



IMPROVEMENTS MADE IN TAMPING MACHINE

THE Railway Maintenance Corporation, Pittsburgh, Pa., has announced a number of improvements in its HR track-raising and tamping machine. This unit consists essentially of a self-propelled car with a long open frame that serves as the track for two carriage-mounted tamping units, each unit equipped with 16 pneumatic tamping tools (eight for each rail). The machine is equipped with hydraulic jacks at each end. The jacks at the end in the direction of travel raise the track to grade and hold it there while the ties spanned by the machine are tamped by the two tamping units working simultaneously but independently.

The design of the original machine has been changed to permit either simultaneous or independent operation of the two groups of tampers on each carriage. Thus low spots or joints on one rail can be brought up to the pre-determined grade without humping or overtamping the other rail. Also, an indicator has been installed on each carriage which informs the operator of the relative elevation of the rail over the tie being tamped with reference to the general grade. Thus over or undertamping is prevented.

For additional information on any of the products described on these pages, use postcards, page 211.

AIR-POWERED TAMPING GUN

THE Ingersoll-Rand Company, New York, has announced a new heavy-duty tamping gun, known as the MT 8, which develops twice the power of the company's MT 4 tamping gun. Reported to be powerful enough to permit leveling track without the necessity of using jacks, the MT 8 is said to be particularly useful for tamping work at crossovers and bridge approaches, and for loosening cemented ballast prior to ballast-cleaning operations. Features of the unit include simplicity of design and low air consumption. Two of the tampers can be operated from the company's new 3R 36 Spot-Air compressor.

OIL FILTER FOR AIR-COOLED ENGINES

THE Wisconsin Motor Corporation, Milwaukee, Wis., has developed an oil-filter cartridge, called the Micro-Fine, for use in the lubrication systems of the V-type four-cylinder Wisconsin air-cooled engines. The new filter is reported to keep the lubricating oil free from the dirt, filings and sludge acid that accumulate in the crankcase and thereby to add many hours of service to the life of the engine. A combination of virgin cotton and plastic-impregnated

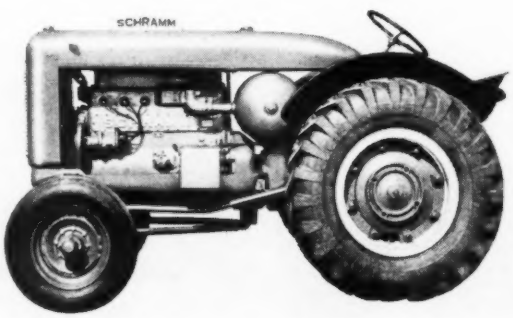
(Continued on next page)

SPIKE-SETTER CARRIAGE

FAIRMONT Railway Motors, Inc., Fairmont, Minn., has announced a carriage designed to make easier and faster the work of setting track spikes in connection with rail-relaying operations. The unit, known as the W79 Series A spike-setter carriage, consists of a spike hopper, 14 in. square by 25 in. high, and a low tractor-type perforated-steel seat, mounted, one at each end, on a length of steel tubing with two roller-bearing double-flanged wheels which run on the track rail being spiked. Balance is provided by a tubular-steel arm extending across the track and terminating in a third wheel which runs on the opposite rail. The third wheel is insulated and turns on Oiltite bearings.

The third-wheel arm is held in position by a removable pin, and may be mounted on either side of the main frame member. Hence, the unit can be worked on either rail and in either direction merely by changing the arm from side to side as necessary.

In operation the track spikes are always within easy reach of the workman who sets the spikes, as the spike hopper has an opening in the bottom of the side nearest him. In moving from tie to tie the workman pushes the outfit with his feet. Weighing 125 lb. complete, the carriage can be easily removed from the track with the aid of a handle on each side of the hopper.



TRACTOR-COMPRESSOR

A MULTIPLE purpose unit, known as the Pneumatractor, which can be used either as an air compressor for operating pneumatic tools, or as a tractor, has been announced by Schramm, Inc., West Chester, Pa. In the power plant of the machine the compressor cylinders and the power cylinders are integrally cast and balanced in the same cylinder block.

The auxiliary tractor attachments available for the unit include a snow plow, a rotary brush, a front-end loader, front and rear winches, a backfill blade, and a post-hole auger. Also available for rear mounting on the machine are a number of pneumatic attachments, including a rock-drill, a concrete breaker and a backfill tamper. The Pneumatractor can be furnished in compressor capacities of 60 c.f.m. or 105 c.f.m.

wood cellulose, the filter is said to remove solids of micron size, measuring less than 0.000045 in., and to hold its own dry weight of solids removed. The thread of the cartridge is machined to fit perfectly on the oil-filter base, assuring a vibration-proof leak-proof oil seal.

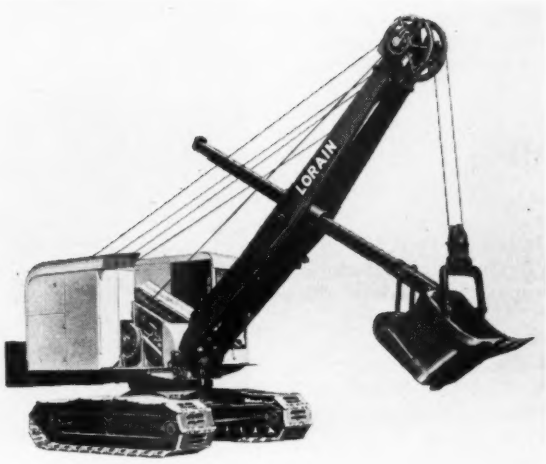
IMPROVEMENTS IN TRACTOR ATTACHMENTS

THE Gravely Motor Plow & Cultivator Co., Dunbar, W. Va., has made a number of design changes in both the sickle-mower and the

gang-mower attachments for the Gravely two-wheel tractor. In the case of the former the drive bracket and the method of attachment were improved to eliminate some of the vibration common to this type of device and to add strength to the drive mechanism of the knife.

For the gang-mower attachment

a transport bracket has been developed to assist in moving the gangs from place to place, and a better swivel action has been provided to permit the unit to follow the contours of the ground.



POWER SHOVEL-CRANE

A NEW power shovel-crane in the 1-yd. class, featuring a twin-disc hydraulic coupling as standard equipment, has been announced by the Thew Shovel Company, Lorain, Ohio. The machine has been named the Lorain-50 in honor of the company's fiftieth anniversary. The hydraulic coupling is reported to prevent stalling of the engine under any digging circumstances, and to provide a means of absorbing digging stresses and strains before they are transferred to the operating mechanism and cables. The coupling is equipped with a "de-clutcher" to permit stopping the machinery without stopping the engine.

The standard power plant of the crane is a Caterpillar six-cylinder Diesel engine equipped with a separate gasoline starting engine which is in turn equipped with an electric starter. A six-cylinder Waukesha gasoline engine is available as optional equipment. The Lorain 50 can be furnished with a complete line of interchangeable boom equipment.

BALLAST REGULATOR AND SCARIFIER

THE Kershaw Manufacturing Company, Inc., Montgomery, Ala., has introduced an improved model of its ballast regulator and scarifier—a self-propelled unit designed for regulating and distributing ballast, dressing track, breaking up cemented ballast at tie ends, pulling in and reclaiming old ballast, and plowing ballast away from tie ends.

The machine is powered by a 100-hp. International engine and is equipped on each side with a hydraulically-operated pocketed wing. Bolted to the sloping blades of each wing are hardened scarifying teeth which, when lowered to the working position, will penetrate the ballast to a maximum depth of 6 in. The machine is equipped with a turntable for use when removing the machine from the track. It is operated by two men.

For additional information on any of the products described on these pages, use postcards, page 211.

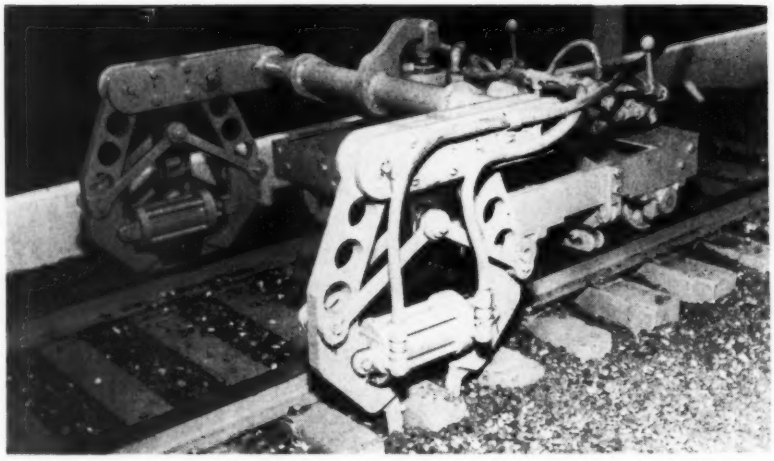
TIE SPRAYER

IMPROVED equipment for spraying materials of heavy consistency on ties or bridge timbers has been developed by the Binks Manufacturing Company, Chicago. The equipment consists of a new air-operated pump, an extension spray gun and connecting hose. The pump, known as the Model A42, has a cylinder with two pistons, one above the other. A separate tube for the material take-off is connected to the cylinder between the two pistons, making the pump double acting. The lower piston provides power on the upward

stroke and the upper piston provides power on the downward stroke. At the same time the upper piston prevents material from reaching the packing or air motor.

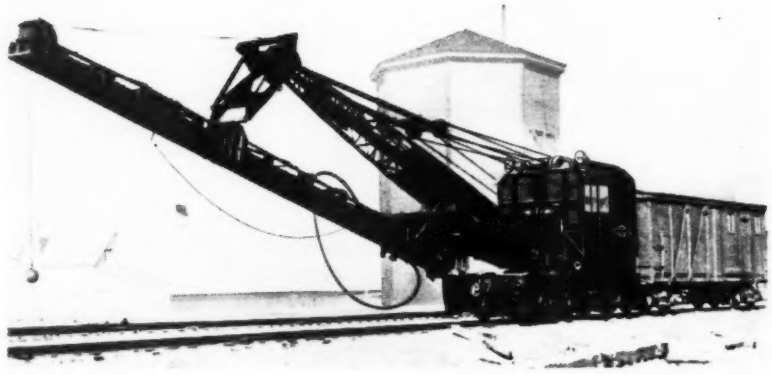
The pump is equipped with two pressure regulators and gages, one to control air pressure to the air motor and the other to control the atomizing pressure at the gun. The pump is reported to be powerful enough to force such heavy materials as cut-back asphalt or emulsions containing various types of fibers or other fillers to the spray gun through 50 ft. of ¾-in. hose.

The Binks extension spray gun, known as Model 25, is especially designed for spraying ties and timbers. It consists of two tubes (one for the material and the other for air) with a nozzle that provides a fan-shaped spray covering a strip 9 in. or 10 in. wide. The gun is 4 ft. long.



TIE SPACER-HOLDER

THE Power Ballaster Products Division of the Pullman-Standard Car Manufacturing Company, Chicago, has announced a machine designed to straighten and position skewed ties automatically and then to hold the ties firmly up against the base of rail for spiking. When used with tie-renewal gangs the machine is expected by the manufacturer to replace at least six men. The power source is a gasoline engine and the various mechanisms are actuated hydraulically. The unit is self-propelled both in moving from tie to tie and in traveling to and from the location of the work.



DIESEL PILE DRIVER

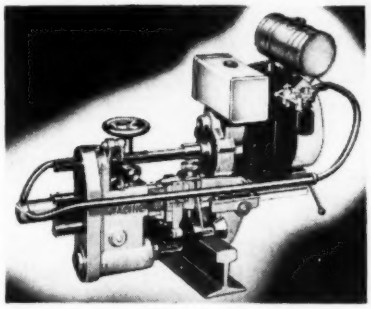
THE Browning Crane & Shovel Co., Cleveland, Ohio, has announced a folding pile driver attachment for the Browning Torqflo diesel locomotive crane. The pile hammer can be powered by a self-contained steam generator mounted on a trailing car. Operating automatically, the steam generator burns the same fuel as the diesel engine of the crane and supplies steam to the hammer through flexible hose and piping. The control valve is mounted on the control stand in the crane cab.

The folding leads of the pile driver can be quickly set for driving either vertical or batter piling. During the driving operation the leads and the crane boom form an integral unit which is said to be as rigid as the truss-type pile driver. The leads can be lowered as the crane travels under its own power in either direction. Thus, rapid clearing of the track for passage of trains can be accomplished when necessary. The Torqflo drive of the crane is said to assure a fast pick-up and get-away.

The folding pile driver leads can be quickly detached from the crane by lowering them over a flat car and removing the pins.

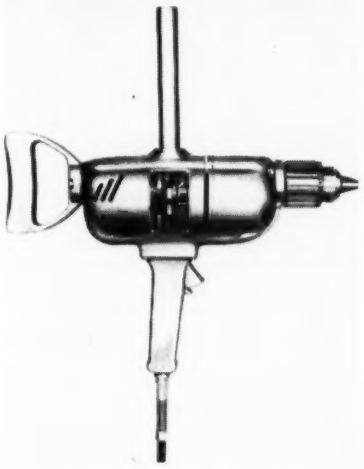
IMPROVED DRILLS

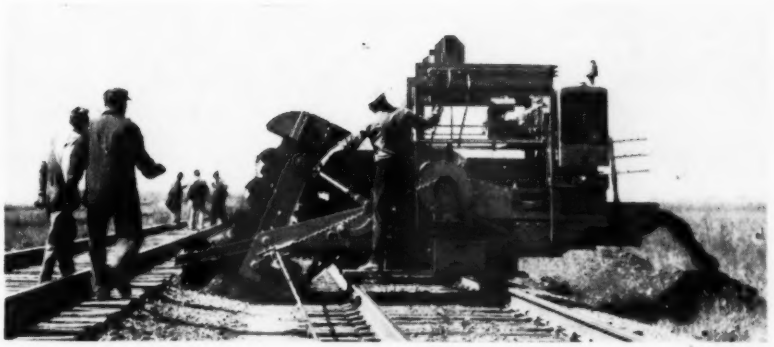
THE Racine Tool & Machine Co., Racine, Wis., has equipped both its portable rail drill and its portable bond drill with improved quick-acting clamping devices which are reported greatly to increase the speed and ease of mounting the machines on the rail and removing them to clear for traffic.



HEAVY DUTY ELECTRIC DRILLS

FOUR completely redesigned heavy-duty electric drills (Models 283, 2101, 2103 and 2121), ranging in capacity from ½ in. to ¾ in. in steel and up to 1½ in. in hardwood, have been announced by Skilsaw, Inc., Chicago. The new design features light weight, compactness, good balance, ease of control, and vibration-free performance. All models have die-cast aluminum-alloy housings, over-size ball bearings, helical gears and geared chucks. Morse taper sockets are available in place of the geared chucks if desired.

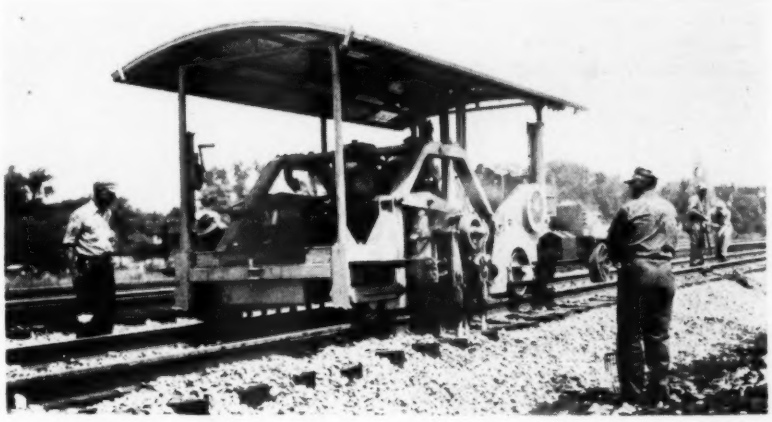




IMPROVEMENTS IN BALLASTEX-SCREENEX

THE Nordberg Manufacturing Company, Milwaukee, Wis., has made a number of improvements in its Ballastex-Screenex combination for reconditioning ballast. For one thing, as an optional feature, self-propulsion has been made available so that the combination can be moved under its own power from one job location to another. For another, the length of the discharge conveyor of the Screenex has been increased to facilitate loading or wasting, and the conveyor mounting has been redesigned to increase ease of handling.

In ballast-reconditioning work the Ballastex excavates fouled shoulder or intertrack ballast and either wastes it to one side or feeds it to the Screenex, which screens the material and returns the cleaned ballast to the tie cribs, the intertrack space, or the shoulders, either individually or divided in any proportion among the three locations. While actually working, the combination is moved by a winch on the Ballastex which winds up a chain anchored to a tie with a special clamp.



IMPROVEMENTS MADE IN TAMPING MACHINE

A NUMBER of changes designed to improve performance have been made in the Matisa tamping machine, according to the Matisa Equipment Corporation, Chicago. This machine is a self-propelled on-track unit with 16 tamping tools which impart both vibration and compaction. A torque-limiting device on the machine provides an automatic safe guard against over compaction.

In making the design changes, the tamping tools were reinforced; the eccentric shaft on the mobile chassis was improved; the drive of the trapezoidal spindles was changed from a duplex to a triplex chain; a damper was added to the lower crossbeam, which limits the vibration of the front end of the machine and also of the untamped track in front of the machine; the brake system was improved; all transmission chains were replaced with standard American types; and the engine clutch was reinforced.

For additional information on any of the products described on these pages, use postcards, page 211.

ELECTRIC HAND LAMP

A NEW portable electric hand lamp, known as the Big Beam Junior, Model No. 111, has been announced by the U-C Lite Manufacturing Company, Chicago. It has a 4-in. lamphead and is powered by one standard six-volt lantern battery. Lantern-to-battery contacts are of the pressure type. Equipped with a parabolic reflector and a glass convex lens, the lamp will transmit a powerful spot light or spread light, as desired. The battery case with its hinged cover is made of 20-gage steel finished with red enamel. The lamphead and handle are chrome finished.

PORTABLE ROLLER

FOR use wherever compaction of materials is needed, a new two to three-ton roller, known as the Model 157 Trail-O-Roller, which can be towed from job to job behind a truck, has been announced by Littleford Bros., Inc., Cincinnati, Ohio. To convert the unit from

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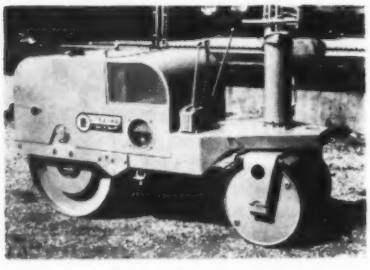


MOBILE CRANE

THE Unit Crane & Shovel Corp., Milwaukee, Wis., has announced a self-propelled crane with a lifting capacity up to 20 tons and a capacity of ¾ yd. in excavator service. Known as the Unit 1520 Mobile crane, the machine is controlled and operated by one man and is powered by one engine. The front steering axle of the machine, as well as the rear tandem axles, is equipped with dual, pneumatic-tired wheels. An air-operated transmission provides four travel speeds in either direction. The road speed is about 13 m.p.h.

TRUCK BODIES

THE Eastern Body Company, Philadelphia, Pa., is offering six types of truck bodies that are applicable for use by railway maintenance forces. One of these is a van panel type that is designed for the general hauling of machines and parts, tools and materials, and is frequently used for transporting men when properly equipped. Another type is a repairman's unit that is suitable for use in making field and running repairs to machinery and equipment. A small utility body is designed for use by signal maintainers, bridge inspectors, and spot welders. A large utility body is available for track maintenance and signal gangs where both men and materials are to be transported. Another utility body is designed for transporting telephone and sub-station line gangs, tools and materials. A sixth is an open express-type body for the general hauling of machines, tools, and materials, and for the occasional transportation of men when tools are not being carried. The bodies are complete with all necessary fittings, lights, etc., and can be also made to suit any special needs.

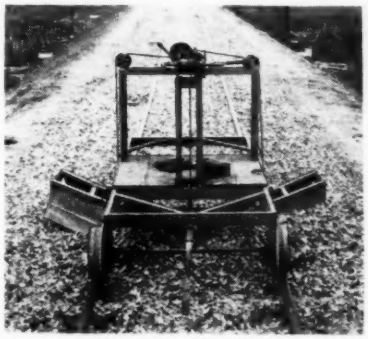
a rolling position to a trailing position, the spindles of two pneumatic-tired wheels are inserted into the frame, then an adjustable tongue is placed at the front of the frame, and finally the load is transferred from the rollers to the trailer wheels by a hydraulic lift. It is reported that one man can make the change in less than 5 min.

When engaged in rolling work the machine is self-propelled by an air-cooled Wisconsin engine. The main roll is 36 in. in diameter by 34 in. wide. The front roll is of the split type and is 24 in. in diameter by 32 in. wide. Both rolls as well as a tank in the hood of the machine can be filled with ballast to give additional weight.

BALLAST PLOW AND DISTRIBUTOR

THE Kershaw Manufacturing Company, Inc., Montgomery, Ala., has announced an improved model of its ballast plow and regulator —an on-track unit designed for removing excess center-unloaded ballast from between the rails, pulling ballast into the center of the track, regulating ballast between the rails to any desired depth, and plowing out all ballast between the rails.

The unit is equipped with a V-type plow with blades both on the inside and the outside of the V-section. The outside blades are used for plowing ballast from between the rails when the machine



is operating in the forward direction. When the unit is operated in the reverse direction the inside blades pull the ballast in, regulating and distributing it in the center of the track. When in operation the machine is towed in the desired direction by a heavy-duty motor car with a four-wheel drive.

IMPROVES ULTRASONIC DETECTOR CAR

SPERRY Rail Service, Danbury, Conn., has announced that the production rate of its ultrasonic detector car, as measured in the number of joints tested per day, has been increased 150 per cent by the addition of automatic oiling equipment, improved detection equipment and by improved handling procedures. This car, which was introduced last year, is used to locate head-web separations and bolt-hole cracks in rails within joint-bar limits. It utilizes intermittent ultrasonic vibrations which are transmitted into the rail from a hand-held searching unit. Any interruptions to the vibrations due to the presence of bolt holes, bolt-hole cracks or head-web separations reflect a portion of the energy back into the searching unit. The reflections are visually indicated on a screen in such a way that the location, size and type of the defect can readily be determined.

BALLAST REMOVER

A NEW off-track machine, known as the PMCO Speed Loader Ballast Remover, which is designed for digging out and removing fouled ballast from track shoulders and the inter-track areas, has been announced by the Pettibone-Mulliken Corporation, Chicago. Basically, this unit is the Trak-Kleener machine except that it has been provided with a different front-end digging arrangement that permits deeper cutting and loading. Digging mechanisms available will produce an excavation up to 8 ft. in width and as deep as 12 in. below the tops of ties.

Manganese blades and paddles dig up the ballast and a winged scraper funnels the foul ballast into the path of dragger-back blades which speed it on to a conveyor belt for disposal along the embankment slopes or into cars or trucks. The machine is reported to produce a smooth bottom in the excavation. Working speeds range up to 30 ft. a min. Its large tires give the machine high maneuverability in crossing tracks and in getting in the clear for trains. It is operated by one man.

For additional information on any of the products described on this page, use postcards, page 211.

OFFERS BRUSH KILLER IN TANK CAR LOTS

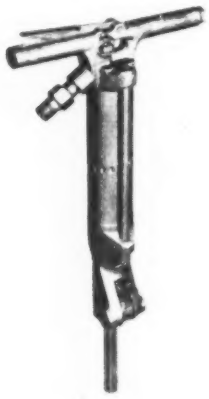
FOR brush control along right of ways, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., is now offering concentrated solutions of its Ammate (ammonium sulfamate) brush killer, delivered in tank cars. Heretofore the chemical was available only in dry-crystal form for on-the-job mixing into solutions.

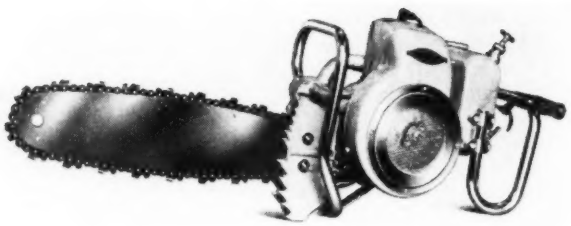
The new Ammate solution, which has been formulated exclusively for railroad use, contains 6.6 lb. of ammonium sulfamate per gallon. A gallon of this solution mixed with 7½ gal. of water will make a spray concentration of ¾ lb. of ammonium sulfamate per gal., which is the strength recommended by the company for killing most woody plants, providing that a thorough coverage of leaves and stems is obtained. The chemical will crystallize out of solution at temperatures below 40 deg. F., but will readily return to solution when warmed to 45 deg. F. or above.

LIGHTWEIGHT PAVING BREAKER

THE Gardner-Denver Company, Quincy, Ill., has added to its line of paving breakers a lightweight (58-lb.) unit, known as the B 37, designed particularly for fast demolition work in locations where the footing is treacherous. The hammer of the new concrete breaker is of the reversible block-pistol type. The use of a tappet, which operates in a renewable bushing, is claimed to minimize wear of the hammer's striking face. The chuck liner is easily replaceable when necessary.

Other features of the tool include a throttle-valve lock which works like the "safety" on a gun; a low-lift plate valve which is claimed to minimize air consumption; a quick-acting latch-type steel retainer to hold the tool securely; and an integral oil reservoir which meters oil to all working parts, including the tool shank.





GASOLINE-DRIVEN CHAIN SAWS

THE Reed-Prentice Corporation, Worcester, Mass., has announced a new line, known as the Model 50, of 5-hp. gasoline-driven portable chain saws. Included in the line are one-man units ranging in cutting capacity from 20 in. to 36 in., and two-man models, equipped with an idler-type tailstock, with capacities of 24 in., 30 in., 36 in. and 60 in. The weight of the saws has been held to the minimum by compactness of design and the use of magnesium-alloy parts wherever possible.

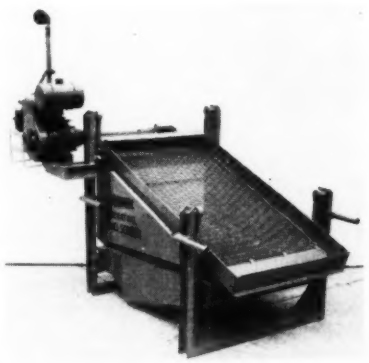
The engine and the cutting attachments of each saw swivel a full 360 deg. and may be locked at any desired angle. Hence, the handlebars and carburetor, which is of the float-type, remain in an upright position on any type of sawing operation. Each saw is equipped with a narrow solid guide bar which minimizes binding, a fast-cutting planer chain which requires no jointing or setting, an automatic clutch which stops the chain when the engine is idling and provides overload protection, and a pressure-fed oiling system which lubricates the chain in all cutting positions.

VIBRATING SAND SCREEN

FAIRMONT Railway Motors, Inc., Fairmont, Minn., has developed a self-contained outfit for fast and efficient screening of sand, which combines a high-frequency vibrating element with a heavy-duty screen having a high percentage of open area. The outfit is intended primarily for use in screening sand in connection with grouting operations, although it can be used to advantage for any type of sand-screening job.

The screen is supported in an inclined position above a hopper by four hanger arms attached to a structural steel frame. Each hanger arm has a rubber bushing at each end. An opening at the lower end of the screen permits the rejected material to fall to the ground.

The vibrating element is attached to the upper end of the screen frame. It consists of an integral eccentric shaft turning on two tapered roller bearings and is enclosed in a housing. A single-cylinder, air-cooled engine, governed to a speed of 3,000 r.p.m., drives the vibrating element through a flexible shaft. For safety the vibrator and drive are totally enclosed. The complete screening outfit weighs 380 lb. and can be lifted by four handles, one at each corner of the unit.



What Our Readers Think

ADDS THOUGHTS ON THE M/W RATIO

Hoboken, N. J.

TO THE EDITOR:

I CONGRATULATE you on the splendid editorial in your January issue, entitled "The M/W Ratio." There is a lot of "meat" in this statement. I have been disturbed for a long time in regard to what might represent a lack of initiative on the part of our maintenance-of-way people as a whole. I am sure that whoever reads your editorial will start to sit up and take notice.

For your ready reference I am attaching a tabulation showing the maintenance-of-way ratio of the Lackawanna for the last 17 years because I know you are familiar with the property and we have often discussed some of our shortcomings. I call your particular attention to the fact that, when depreciation accounting went into effect in 1942, the maintenance ratio on the Lackawanna automatically went up 2 percentage points based on a gross income of $80,000,000. With the advent of depreciation accounting it became necessary to charge track retired and not replaced to maintenance-of-way operating expenses, whereas formerly it was charged against profit and loss and did not appear in the maintenance-of-way figures.

For your information I am also attaching a statement that shows the 20 railroads in the United States with the lowest ratio in 1949, including depreciation and retirements; and I am attaching a second statement showing the 20 railroads with the lowest ratio in that year, deducting depreciation and retirements. These show you what a great difference it makes to a railroad with a high depreciation such as the Lackawanna.

Maintenance-of-Way Ratio
D. L. & W.

1934	8.36	1942*	9.75
1935	9.53	1943	10.39
1936	8.44	1944	10.93
1937	7.99	1945	13.00
1938	7.02	1946	12.54
1939	6.58	1947	12.47
1940	7.13	1948	11.66
1941	7.48	1949	12.82
1950	11.34		

*Depreciation accounting in effect in 1942 and subsequent years.

G. A. PHILLIPS
Chief Engineer
Delaware, Lackawanna & Western

Twenty Railroads with the Lowest M/W Ratio in 1949, Including Depreciation and Retirements

	Railway Operating Revenue	M.W.&S. Expenses	Ratio
Colorado & Wyoming	$ 2,215,937	$ 171,221	7.73
Kansas City Southern	39,746,239	3,358,178	8.45
Elgin, Joliet & Eastern	41,821,213	3,726,441	8.91
Atlanta & West Point	4,012,074	456,782	11.39
Bessemer & Lake Erie	21,529,703	2,488,568	11.56
Montour	2,401,616	278,325	11.59
Louisiana & Arkansas	18,757,009	2,204,185	11.75
Western Alabama	4,042,450	478,189	11.83
Detroit & Toledo Shore Line	6,028,542	719,259	11.93
Burlington-Rock Island	5,027,386	610,982	12.15
Chicago & Illinois Midland	7,429,719	906,986	12.21
Pennsylvania	848,211,159	105,352,602	12.42
Baltimore & Ohio	356,708,017	44,399,941	12.45
New York, Susquehanna & Western	4,541,127	566,509	12.48
Southern Pacific	418,444,561	52,473,056	12.54
Delaware, Lackawanna & Western	80,476,508	10,316,315	12.82
Detroit, Toledo & Ironton	15,049,255	1,937,734	12.88
New York Central	697,304,399	91,310,666	13.09
St. Louis Southwestern	60,175,357	7,934,279	13.19
Pittsburgh & Lake Erie	36,767,098	4,856,523	13.21

Twenty Railroads with the Lowest M/W Ratio in 1949, After Deducting Depreciation and Retirements

	Railway Operating Revenue	Money Outlay M.W.&S. Expenses*	Ratio
Elgin, Joliet & Eastern	$ 41,821,213	$ 3,455,110	8.26
Kansas City Southern (including Louisiana & Arkansas	58,503,248	4,969,680	8.49
Pennsylvania	848,211,159	88,905,255	10.48
Delaware, Lackawanna & Western	80,476,508	8,607,048	10.69
Bessemer & Lake Erie	21,529,703	2,302,018	10.69
Baltimore & Ohio	356,708,017	39,044,376	10.94
Long Island	49,996,234	5,549,753	11.10
Southern Pacific	418,444,561	46,608,580	11.14
Virginian	29,208,704	3,259,089	11.16
New York Central	697,304,399	79,238,601	11.36
Denver & Rio Grande Western	65,689,066	7,491,961	11.40
Chicago, Rock Island & Pacific	184,656,845	21,624,314	11.71
Central Railroad of N. J. & Penna.	54,154,730	6,344,229	11.71
Pittsburgh & Lake Erie	36,767,098	4,346,721	11.82
St. Louis Southwestern	60,175,357	7,126,023	11.84
New York, New Haven & Hartford	144,690,868	17,168,960	11.87
Erie	149,109,907	17,835,443	11.96
Western Maryland	38,936,544	4,709,639	12.10
Lehigh Valley	69,181,281	8,479,570	12.26
New York, Chicago & St. Louis**	127,365,168	15,854,675	12.45

*Figures in this column exclude depreciation, retirements and other accounting adjustments.
**Includes figures for Wheeling & Lake Erie.

THAT HIGH M/W RATIO

TO THE EDITOR:

I HAVE read your editorial "The M/W Ratio" in the January issue and I think you overlooked the greatest factor in causing this ratio to reach its present high level. That is deferred maintenance. If one gets around right on the ground, especially on outlying districts, it will be found that the properties are in no better condition now than they were 12 years ago. In fact, there are projects such as rail renewals and building renovations which were programmed for 1930 that have never been done.

There are existing today many conditions which have been making division engineers and their staffs, down to and including section foremen, gray headed for years. Because someone refuses to admit conditions these conscientious men must work and worry and, without the proper materials, they find at the end of each year that they are no better off generally than they were last year.

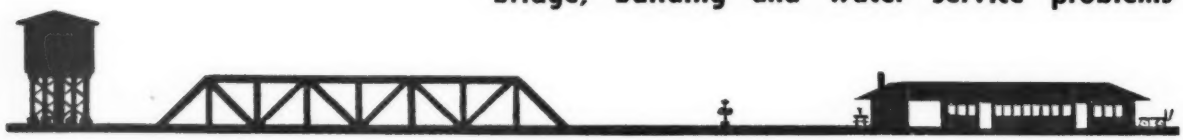
It is quite discouraging to resurface the same spots over and over again for years due to poor drainage or poor ballast conditions or rail conditions (corrugated rails, bent rails or mismatched rails which, even though welded back to the ends of the angle bars, still cause pounding). Or to have to regage track frequently because of tie conditions due to lack of new ties or to an insufficient force to renew ties as they should be renewed. Or to change out only rails that have completely failed, one here and one there, and, when signs of head-and-web separation appear, watch each such rail and do not change it until it shows active on both sides.

False economy is one of the big reasons for the high M/W ratio.

TRACK FOREMAN

WHAT'S THE ANSWER?

An open forum for maintenance men on track, bridge, building and water service problems



Pile Drivers on Dieselized Roads

What are the most practicable methods of furnishing steam for pile drivers in completely-Dieselized territories? Explain.*

Convert to Oil in Some Way

By E. F. CROXON
Assistant Engineer of Bridges, Southern, Charlotte, N. C.

When coal-burning railroads are completely dieselized, oil usually replaces coal as the most available fuel. It is then very simple and relatively inexpensive to convert coal-burning pile drivers, cranes, ditchers, etc., to the use of oil fuel.

Wherever oil is available for fuel it has advantages over coal. With oil fuel a head of steam may be obtained faster from a cold start, stoppages while waiting for steam are fewer and of shorter duration, and in some instances savings may be effected by dispensing with the services of a fireman.

A tender and tank car with running supplies of oil and water must be kept with the pile driver at all times. In addition an auxiliary oil-water tank should be used to make it possible to send for oil and water without interfering with pile-driving operations; thus refueling interruptions may be practically eliminated.

Two new developments hold out hopes that other alternatives may be possible. One of these is a recently announced steam generator which, using oil for fuel, makes steam very rapidly, and the other is a self-contained pile hammer operating on diesel fuel. These developments may make it possible to solve this problem by equipping diesel-powered pile drivers with a pile hammer which operates on Diesel fuel, or with a steam generator for operating a conventional steam hammer.

Developments Moving Fast

By WORK EQUIPMENT SUPERVISOR

There is no doubt but that pile-driving equipment needs modernization. I am constantly being asked by our bridge engineer or his subordinates for information on the latest developments in the design of this equipment. Since our railroad is becoming more and more dieselized, these men are particularly interested in equipment that will harmonize with that type of operation.

So far, besides advising these men that manufacturers are aware of their needs and are now developing new types of equipment, I have been able to point to only three specific developments. One of these is a self-contained, diesel-operated pile hammer developed in Germany and now being tested in this country. An American manufacturer is understood to be building 100 of these hammers for the Navy and some may be available for railway test purposes before long. This hammer looks very promising.

The second development involves the use of oil-fired, flash-type boilers to furnish steam for operating steam hammers. Boilers of this type have recently been

(Continued on page 278)

*See page 254 of this issue for an article telling of a pile driver on the New York Central in which the original coal-burning boiler was replaced with an oil-burning flash-type steam generator.

Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, *Railway Engineering and Maintenance*, 79 W. Monroe St., Chicago 3, and reach him at least 30 days in advance of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any questions which you may wish to have discussed.

To Be Answered In the May Issue

1. How many laborers can one foreman handle efficiently in track work? Does the character of the work make any difference? Under what conditions should he have an assistant?

2. How can types of safety signs now commonly in use be improved so that they will continue to attract the attention of persons who work daily in their vicinity? Explain.

3. Under what circumstances, if any, should division engineers, supervisors, roadmasters, or other supervisory personnel, make use of automobiles in lieu of track motor cars or trains in the performance of their duties? Explain.

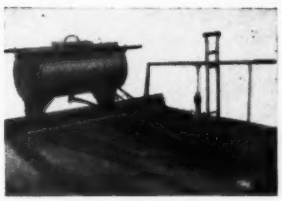
4. What is the most economical method of securing track ties to steel bridge spans to prevent the loss of the entire deck in case of high water?

5. What factors must be given consideration in deciding whether to provide attachments for roadway machines to convert them into multi-purpose units? What arrangements should be made to have the attachments available with the machine at all times?

6. On what schedule should diesel fuel meters be overloaded or recalibrated to insure accurate registration? Should the work be done by the railroad or the meter manufacturer?

WOOLERY self-propelled off-track Joint Oiler with three operators can spray joints on 1½ miles of track per hour. Uses heavy lubricants heated in 25-gallon tank and sprayed into joints under pressure, for thorough, long-lasting economical lubrication. Only 30" wide, to operate easily or turn around between double tracks.

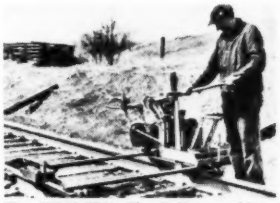
WOOLERY Tie Plate Spacer quickly and accurately locates single or double shoulder plates at exact position on ties. Light in weight so that one man can easily handle it on or off track. Simple adjustment allows for changes in rail sizes. Ruggedly built for long service, this machine greatly speeds the job of rail laying.



WOOLERY Creosote Sprayer, with 60 gallon tank capacity. Equipped with generator burner to heat creosote, and wind protection hood to safeguard operators, it applies a metered amount of creosote to each freshly-adzed tie. Does a safer, more economical and uniform job than is possible by old fashioned hand swabbing or broom-and-pail methods.

WOOLERY

maintenance machines for better track at lower cost



The WOOLERY Tie Cutter provides a proven money-saving method of removing old ties without trenching, jacking up track, or adzing tops of rail-cut ties.

The WOOLERY Tie Cutter and Undercarriage enables one man to quickly cut each worn tie into three easily-removable pieces which can be lifted out without disturbing the ballast, so that new ties can be reseated on a firm bed. With this modern machine the entire cutting operation is performed without lifting or turning, by traveling the cutting mechanism across the undercarriage to cut both ends of the same tie, and rolling the whole apparatus along the rails to successive tie positions. Total cutting time per tie is less than two minutes.

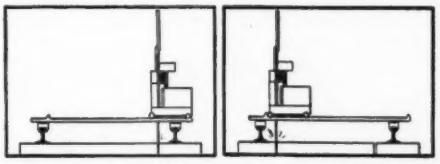
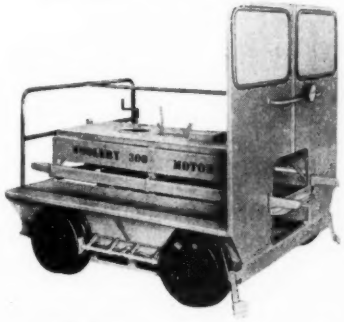
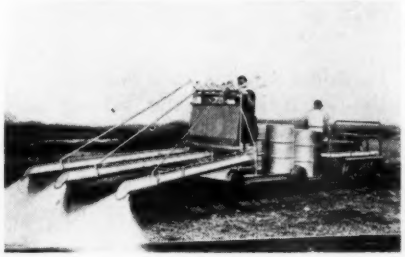


Figure 1—Making first cut at right end of tie, close inside rail.

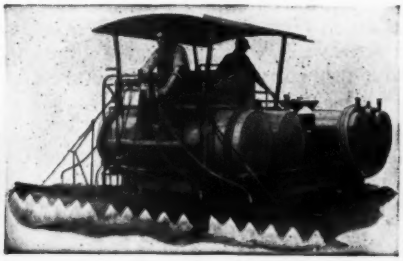
Figure 2—With machine moved to left end of tie, making second cut.

WOOLERY 300 Motor Car gives advantages of a light car, plus greater pulling power with 4 wheel drive and heavy duty performance. Carries 8 men and track tools. Can be fitted with detachable WOOLERY Flangeway Cleaner for winter duty.





WOOLERY Model PB-B Weed Burner will destroy a swath of weeds 15 feet wide in one trip or up to 25 feet with burner arms extended on second run. All three burners have electric ignition and individual controls. Only two operators required. Other WOOLERY Weed Burners in 1-burner and 5-burner models.



WOOLERY dual purpose Combination Sprayer and Weed Burner permits choice of chemical spraying (near buildings or in areas where burning is not practical) or weed burning, as desired. Chemical sprayer covers 18-foot swath. Burning unit at opposite end covers 15 feet first trip; up to 25 feet second trip.

Your inquiry will bring detailed information on cost and performance of WOOLERY Maintenance Machines.

WOOLERY MACHINE COMPANY

MINNEAPOLIS MINNESOTA

Pioneer Manufacturers of RAILWAY MAINTENANCE EQUIPMENT

RAILWAY WEED BURNERS • MOTOR CARS • FLANGEWAY CLEANERS • TIE CUTTERS • TIE PLATE SPACERS • RAIL JOINT OILERS • CREOSOTE SPRAYERS

EXCLUSIVE EXPORT REPRESENTATIVES: PRESSED STEEL CAR COMPANY, INC., NEW YORK, N. Y.

used to replace coal-burning boilers in track-type pile drivers on several roads and are said to be giving satisfactory service. They are being used by contractors to supply steam for hammers handled in leads by crawler and truck-type cranes. In such uses they are reported to be far superior to compressed air or old-style stationary boilers.

An announcement of the third development—diesel-powered pile drivers—is expected at any time. It is known that at least one manufacturer is designing such equipment and hopes to have it on the market before too long. Perhaps a combination of diesel power and a flash-type steam generator will furnish the ultimate answer to pile driving on dieselized railroads. Certainly such a combination will have a definite usefulness in railway bridge construction and maintenance.

Supplying Fuel and Water to Diesels

In supplying fuel and boiler water to Diesel locomotives, is it better to provide several relatively long hoses or to install a series of standpipes each having a short flexible hose? Explain.

Use Short Hoses

By B. W. DeGeer

Engineer Water Service and Fuel Facilities, Great Northern, St. Paul, Minn.

Facilities which allow the use of short flexible hoses provide the best layout. Long hoses are heavy to handle, difficult to store in convenient locations and wear out rapidly. Also, the friction through long hose sections decreases pump capacity and increases the length of time required to provide fuel or water.

Care must be exercised in locating facilities using short hoses so as to make them available for use, to the greatest possible extent, on diesel units of different lengths. When so located they have proven to be very satisfactory.

Short Hoses Reduce Expense

By J. E. Wiggins, Jr.

Assistant Engineer Water Supply, Southern, Washington, D. C.

Efficiency and economy of operation are of prime importance in the design of facilities for delivering fuel oil and boiler (steam generator) water to diesel locomotives. Facilities for these services should therefore be designed to meet efficiently the operating requirements at the lowest possible cost. The length of hose used between pipe outlets and diesel locomotives is one of several factors influencing such a design.

Generally, fuel oil and boiler water are pumped to diesel locomotives at the rate of 300 g.p.m. and 500 g.p.m., respectively, through either 4-in. or 6-in. pipe. This pipe is reduced at the outlet end for 2½-in. hose connections.

Friction created by the flow of liquids through pipe and hose adds to the work for the pump and its motor and consequently increase operating costs. It is therefore desirable from an economical viewpoint to hold friction, sometimes called loss of head due to friction, to a minimum. With a constant rate of flow, friction increases very rapidly as the pipe diameter is reduced. For instance, at 300 g.p.m. the head loss due to friction is about seven times greater when pumping through 4-in. pipe than when pumping through 6-in. pipe, and 70 times greater when the pipe diameter is 2½ in.—each foot of 2½ in. hose adding 1/7 hp. of work for 300 g.p.m. pumping and ½ hp. for 500 g.p.m. pumping. In the interest of economy, it is therefore essential to use hose as short as practicable.

Taking these factors into consideration, we have found that 10-ft. sections of hose attached to standpipes advantageously spaced provide an efficient facility that generally complies with operating requirements.

Economic Bulldozing Distances

What is the maximum distance bulldozers can push material economically? What factors determine the distance? Explain.*

Economy Not Only Factor

By George S. Crites

Division Engineer (Retired), Baltimore & Ohio, Baltimore, Md.

Expediency rather than economy is the ruling factor in the distances material is pushed by bulldozers. Generally, the full loads pushed per hour provide the measure of efficiency. Where a cut is to be cleaned or widened with no adjoining fills to be reinforced, the wasted material should be put at a place where the round trip takes the least time, providing the location of the spoil bank improves the drainage of the right of way. Seldom does distance govern this selection of the disposal place.

Widening fills with mud from cuts is a bad practice whether done with bulldozers or otherwise. Such practice induces water pockets, slips and slides because it is not often possible to avoid cleavage planes when material is dumped on the slopes of fills. However, some materials removed from cuts being widened may be suitable for fills but they must be properly selected and placed. This would involve figuring over-haul if it were to be done economically, but no set value for over-haul can be established for all locations even in the same territory. Therefore, in actual practice, the distance a bulldozer can push materials economically is not figured.

It is generally better to figure the quickest way material can be gotten from where it can be spared, to the place it is needed or can be wasted, and then throw fixed distances out of the window.

(Please turn to page 280)

*An answer to this question was also received from F. E. Schaumberg, special representative, Caterpillar Tractor Company, but, because of its comprehensive nature, it was withheld for publication as a feature article in a later issue.

Is ground water diluting your maintenance budget?

You'll often find that excessive roadbed maintenance can be charged to harmful ground water in the subgrade. It causes unstable foundations and jittery roadbeds.

You can "plug this leak" once and for all by installing subdrainage with Armco Perforated Pipe. Scientifically placed holes in Armco Pipe collect unwanted water and it is drained out along the invert. There is little or no danger of clogging. And the tightly connected conduit won't disjoint or pull apart. Corrugated metal design assures ample strength to prevent crushing or cracking.

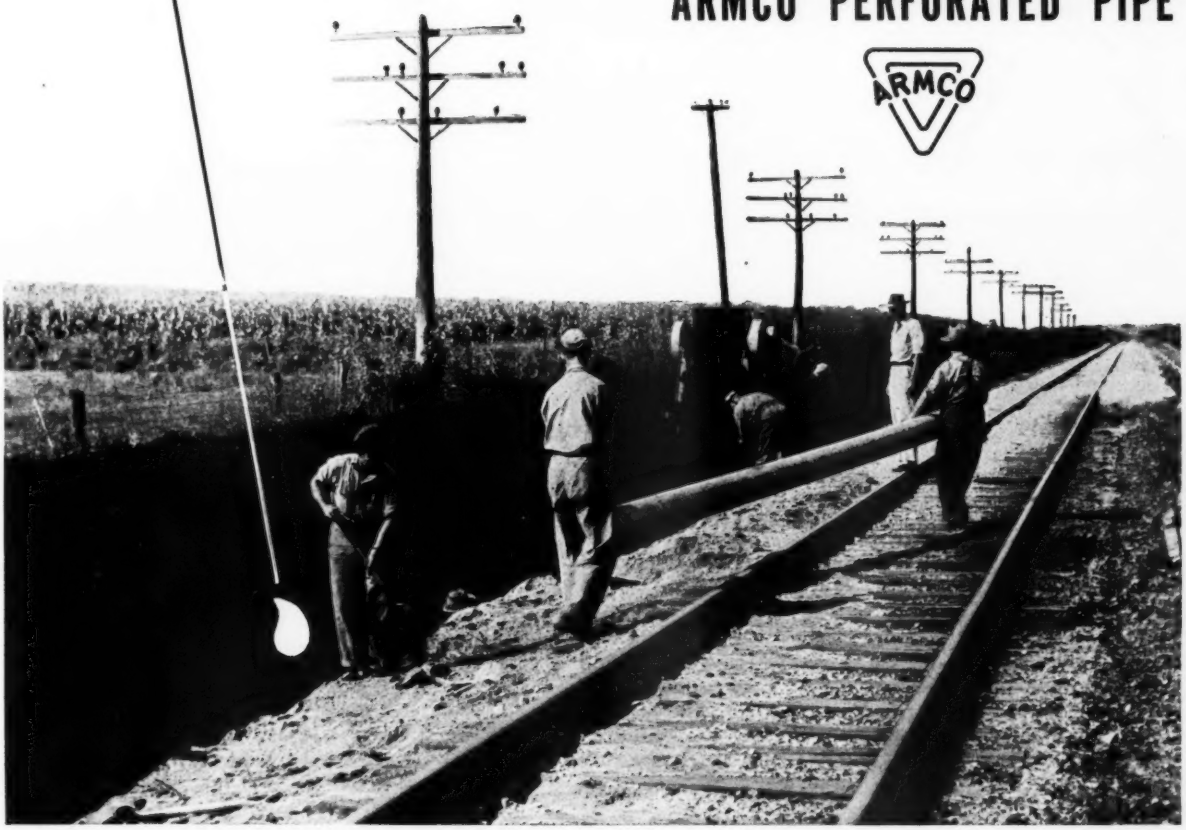
Installing an Armco Subdrainage System is easy and costs less than you might expect. Two men readily handle the long 20-foot pipe lengths. Joints are quickly made with simple bolted couplers.

Why not try Armco Perforated Pipe and see for yourself how it eliminates ground water problems. Write for complete information. Armco Drainage & Metal Products, Inc., 3361 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation.

Export: The Armco International Corporation.

ARMCO PERFORATED PIPE

ARMCO



Fueling and Lubricating Work Equipment

What is the safest, cleanest and most economical method of delivering fuel and lubricating oils to a single unit of work equipment on line of road? To several machines at one location? Explain.

Dealer Delivery Is Best

By P. S. SETTLE
Assistant Division Engineer, Pennsylvania, New York

The quantity of fuel to be delivered to a given location should be the determining factor in deciding on the method of delivery. Where a single large machine or a group of machines will take a delivery of 200 gal. or more of fuel, it is generally possible to have a local bulk-plant dealer make the delivery by tank truck. Unquestionably, this is the best method because the cost of delivery and the responsibility for quality and safety are assumed by the dealer rather than the railroad.

When small fuel requirements or inaccessibility of equipment eliminate the tank-truck method, the next best method is to make the deliveries in conjunction with the delivery of material and supplies and by the same means. This can best be done by locating a fuel storage tank and bulk lubricant-storage facilities at the material yard on each track supervisor's territory. The fuel and lubricants can then be handled in drums, safety cans, or other receptacles from this storage point by trucks, track motor cars, or work trains.

This method requires adequate supervision or its advantages will be lost. To begin with, proper containers must be provided to prevent leakage, loss in transfer, and contamination. The use of such containers will reduce the fire hazard to the minimum and the "safety" part of the job will then consist of training employees in the precautions to be observed. To keep the cost down the supervisor must organize the work so that fuel and lubricants are delivered in conjunction with the regular deliveries of material and supplies rather than on special trips. This requires the cooperation of all machine operators to the end that their needs are anticipated and enough fuel is ordered for regular delivery trips so that last-minute special trips for this purpose are not required.

Using Sectional Metal Scaffolding

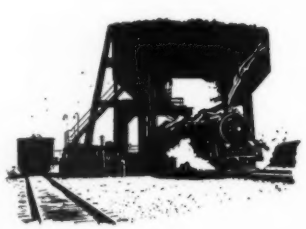
What are the advantages and disadvantages of sectional metal scaffolding for use by B. & B. forces? To what extent can its purchase be justified? On what basis should such scaffolding be assigned to railroad forces?

Convenient But Expensive

By W. C. HARMAN
Bridge and Building Supervisor, Southern Pacific, San Francisco, Cal.

There are few disadvantages in the use of sectional metal scaffolding but, as efficient as it may be, the initial cost is high enough to discourage its general use by B&B gangs. Other disadvantages are: (1) It requires considerable storage space; (2) unless kept under cover many types are susceptible to corrosion; and (3) it is cumbersome to handle on push cars or small trucks. Our B&B forces can not all be efficiently provided with this type of scaffolding because of the little use they have for it except on special jobs.

However, there are many advantages of certain types of sectional metal scaffolding. It is light, and is easily and quickly installed. Once in place it is noncollapsible by minor collisions such as might seriously damage or collapse wooden scaffolding. This feature, together with its resistance to fire, reduces the hazard of personal injury to the minimum. Skilled men are not required to erect it. Because of the manner in which it is set up, errors or unforeseen weaknesses in its construction are practically absent and those men working in high places appreciate the security this feature gives them. Such security certainly extends to all supervisors who, when using such scaffolding, can rest assured that their men are working on safe supports.



Once it is assembled this type of scaffold remains about two-thirds fabricated. Given reasonable care, it will last indefinitely and be ready at all times for use by carpenters or painters on buildings, tanks, stacks or other structures.

The rapidity with which it can be erected and dismantled when used in waiting rooms or other public places creates a minimum of interference or inconvenience to the traveling public. Even at its best, wooden scaffolding is a hindrance to our patrons when it is used in waiting rooms.

The assignment of metal scaffolding to B&B forces would have to be limited to those at terminals where its use would be more continuous. At these points enough units could be stored so that, when needed by gangs on line, enough sections could be shipped out to handle their work. For major scaffolding jobs the units from all terminals could be consolidated. For such uses, its purchase, even at high prices, can be justified by its long-term economy.

Advantageous at Terminals

By LEO DENZ
Chief Carpenter, Chicago, Milwaukee, St. Paul & Pacific, Chicago

In the larger cities where terminal divisions exist, there are usually several large buildings that must be painted or repaired on the inside. For this kind of work, sectional metal scaffolding is ideal, especially for use in large waiting rooms, offices, powerhouses, etc. For repairs to most other types of buildings any single kind of this sectional scaffolding would not answer all purposes.

Sectional scaffolding is suitable for some types of outside work. For instance, the old frame water tank that is fast fading out of the picture can best be served by scaffoldings of this type. Repairs to

(Continued on page 282)

deep water or swamp—

NO PROBLEM FOR MONOTUBE

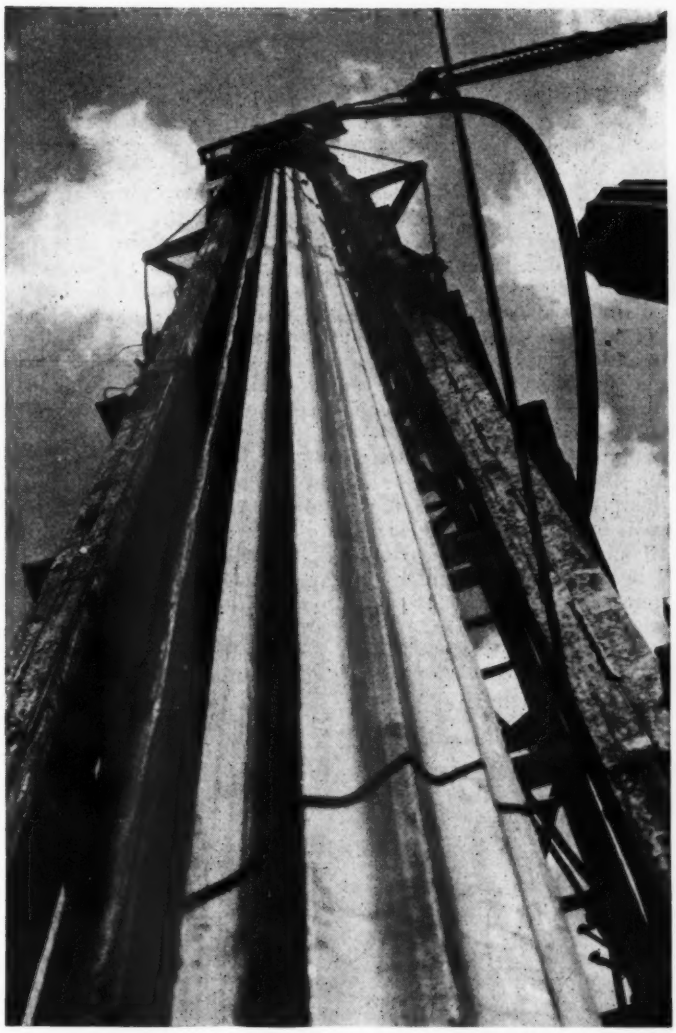
tapered steel piles

BRIDGE foundations often pose tough problems. No exception was the construction of the 900-foot trestle-type bridge across the Tuckahoe River on Maryland State Route 328.

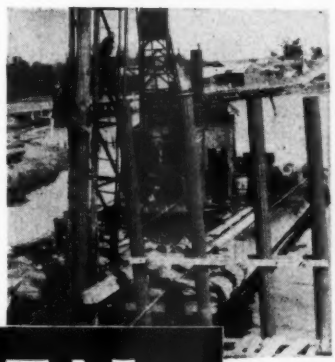
Here, engineers faced a 3-way foundation problem: deep water . . . swamp areas with soft layers of alluvial mud . . . and the need for a full 18-foot clearance above mean tide in the channel area. Careful studies proved Monotube tapered steel piles to be both the ideal *and* the lowest-cost solution to an unusual problem.

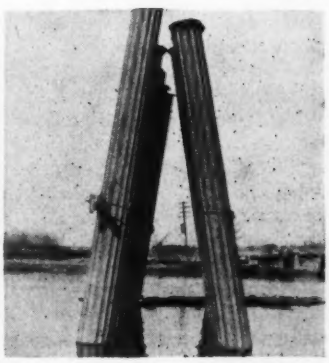
Rugged Monotubes, cold rolled and fluted, offered the extra columnar strength and stability that meant sound construction with a minimum number of piles. Light in weight, easy to handle, and extendible right on the job, Monotubes could be placed and driven *fast* with average driving equipment. Moreover, the wide variety of Monotube diameters made it easy and economical to obtain the required column strength at *any* location . . . deep water or soft mud.

Monotubes come in lengths, gauges, sizes and tapers for varying soil conditions . . . save time and money in all kinds of foundation work. For complete, helpful data, write The Union Metal Manufacturing Company, Canton 5, Ohio.



Looking at 65 feet of Monotube pile straight up from the water. Approximately 10,000 feet of 7 gauge and 3 gauge piles were used for the Tuckahoe River bridge, built for Maryland State Roads Commission by Tidewater Construction Company, under direction of Walter C. Hopkins, Deputy Chief Engineer.





Left: Welding extensions to tapered portion . . . a big time-saving.

Right: Twelve Monotube piles driven for a double bent . . . strong, rigid, good for years.

UNION METAL

Monotube Foundation Piles

these tanks require a considerable amount of lumber for scaffolding. In view of the present price of lumber, and the lack of help experienced in building scaffolding, sectional metal scaffolding would be safer and less expensive.

This scaffolding should be rented when needed. It would not pay to furnish each crew with a set of sectional scaffolding because of the room required to store it and the possibility of parts being lost while not in use. If scaffolding is frequently required on a division and the proper kind cannot be rented readily, I would recommend the purchase of a single set to be used by any crew on the division needing it. The type to be bought should be determined first on the basis that it would be adaptable to all jobs and then on its qualities. This set of scaffolding could be transferred from one crew to another.

Has Many Advantages

By Daniel P. Closser

Assistant Sales Manager, Safway Steel Products, Inc., Milwaukee, Wis.

The use of tubular steel scaffolding has been recognized as a "must" by leading contractors. Scaffolding is as important to construction and maintenance men as the equipment or material upon which they work. Railroads obtain many advantages in using this type of scaffolding: (1) Portability—it can be dismantled and moved to any location; (2) mobility—it can be equipped with casters and rolled to follow the work; (3) easy and rapid erection without special tools—which saves labor cost; (4) lifetime service with only normal maintenance care; (5) economy—costs less than lumber; (6) flexibility—can be fitted for use with structures of any shape; (7) safety—it is engineered to withstand harsh treatment and heavy loads; and (8) it can be quickly dismantled without special tools or equipment, for use elsewhere or for storage.

Many railroads are already using tubular-steel scaffolds, and many are now in the market to buy such equipment. It is ideal for use in the repair and maintenance of buildings, both exterior and interior; in building portable ramps for trucks or other heavy equipment; as members for supporting water lines or conveyors over tracks; in the repair of storage tanks; and in the maintenance of smoke stacks.

Sectional tubular-steel scaffolding, in general, can be used any place where workmen or equipment must be provided with safe, roomy platforms above the ground level. In acquiring scaffolds care must be used to see that they are safe, easy to erect, properly engineered, and long lasting.

Adaptability Big Advantage

By T. C. North

Chief Engineer, Universal Manufacturing Corporation, Zelienople, Pa.

Sectional metal scaffolding can be used to advantage in all cases where scaffolds are required. The ease and speed of its erection by unskilled labor, the small storage space required, and its 100-per cent salvage, with long life and definite load capacities, make such scaffolding superior to that built of wood.

Scaffolds, including rolling towers, of any desired size, length and height can be fabricated from sectional-type scaffolding with its various types of panels and auxiliary components. With the use of putlogs, scaffolding can be bridged over machinery, enclosures or other floor obstructions. Scaffolds having clear passageways underneath and requiring a minimum of floor space are available. This feature is of special advantage in station waiting rooms.

Various railroad departments can make economical use of this equipment by having a reasonable quantity available at important terminals and repair shops. The building construction and maintenance department can make the greater use of the equipment, but it is adaptable to use by the bridge department in certain cases. The equipment can also be useful to the water-service department.

Welding Manganese Crossing Frogs

Where manganese crossing frogs are subjected to fast, heavy traffic, is it a better policy to weld them, when necessary, in or out of track? Why? What factors determine when they should be welded? Explain.

Weld Out of Track

By C. W. Reeve

Division Engineer, Delaware & Hudson, Oneonta, N. Y.

Manganese crossing frogs that are subjected to fast, heavy traffic should be welded out of track, except in cases of emergency or when it is impossible to remove the frog. To do this, of course, there is unusual expense involved. At present labor rates, the cost of changing out a crossing frog can run in excess of $100.

However, an unsatisfactory welding job will result if a welder attempts to repair the frog under traffic. In the first place, preheating cannot be satisfactorily controlled. Frequent interruptions during the welding process cause a poor bond on the parent metal. Wheel impacts on partially completed welds set up hairline cracks throughout the welded area. Where traffic is frequent post heating is difficult to control.

These are obvious reasons for welding frogs out of track. There are several other factors involved which are frequently not considered. When welding any metal under traffic, the welder cannot completely concentrate on using his utmost skill. He is subconsciously handicapped by the constant thought that he will soon have to clear up for a passing train. This has an adverse effect on the quality of the weld. When welding under traffic the area being heated cannot be kept entirely clean. Small particles of sand and stack ash are swept by passing trains along the track, and regardless of how carefully the welder works, some of these particles get into the weld and cause cracks.

Manganese crossing frogs should be welded as infrequently as pos-

(Continued on page 284)

The READE COMPANY Produces All Types of Weed Killer

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PLANTS IN NUMEROUS RAILROAD CENTERS

sible. Too frequent welding can damage them. One way to avoid this is to use a grinder frequently to smooth up the corners of a crossing frog and to slope down any abrupt points of wear. This reduces impact on the vulnerable portions of the frog. A manganese frog should be welded only when it is in such condition that serious damage to the entire casting will result, if it is not repaired.

Usually Weld in Track

By H. C. Koch

Roadmaster, Belt Railway of Chicago, Chicago

If the condition of a manganese crossing or frog should suddenly become unsafe and welding equipment is not readily available, it would be necessary to take the unsafe material out of the track and replace it with a spare frog. In such instances the crossing or frog should be repaired before it is used again, but every precaution must be taken by the welder to prevent warping of the material. In all other cases repairs should be anticipated by making frequent inspections and, when welding is necessary, the work should be scheduled and performed with the crossing or frog in the track.

When manganese material is welded in the track, the cost is about the same as when repairs are made out of the track, except that the cost of taking it out of the track is eliminated. Another advantage of doing the work in track is that the surfaces of connecting rails match with those being repaired, a condition that may not exist if a spare replacement is used. Furthermore there is less danger of a crossing or frog warping while being welded if it is connected to the track rails and solidly spiked to ties.

Welding and grinding operations should have adequate flagging protection and it may be necessary to operate trains at reduced speed while repair work is in progress. When welding repairs are scheduled before failures occur, the work can usually be performed between train movements without rerouting or otherwise delaying trains. However, when it is necessary to reroute trains while some phase of the repair work is in progress, the delays to trains are less than they would be if the crossing were replaced with a spare.

Supervisors, foremen and other interested employees soon "spot" those manganese crossings and frogs that wear rapidly. Inspections at these locations are frequent and it can be determined from experience when welding should be performed. The factors determining the scheduling of work should be: (1) Impairment of the smooth riding or safety of the track at authorized speed; (2) extent of wear and breakage of corners and points; (3) the number of cracks, separations and soft spots; (4) the availability of a serviceable spare (if a spare is not available everything possible should be done to avoid a complete failure); and (5) the amount of damage to the roadbed that will inevitably be caused by the pumping action of the track structure when engine and car wheels pass over crossings and frogs.

Manganese crossings are special items of material and because of their high cost good replacements are not always available. They should be maintained in a manner that will assure their longest service life. Scheduling of welding repairs in time will help to prolong their usefulness, but equally important are the maintenance of good line and surface, adequate drainage, sound timbers and tight bolts. In fact, when these details are in good condition, crossings are subject to less wear and breakage and welding repairs are necessary less frequently.

Keep in Service By Welding

By General Welding Foreman

From continued close study of more than 27 years of research and field operations I believe welding on high-manganese steel crossings and frogs should be kept strictly in a category of "maintenance by welding" of these track units. The objective should be to keep crossings and frogs in sound, smooth-riding condition through continual planning and programming. This involves much more than merely a series of welding jobs. Accurate cost records covering performance of individual track units and individual employees or crews will reveal the worth of these recommendations. The fact that crossings are subjected to fast, heavy traffic in my opinion has no bearing.

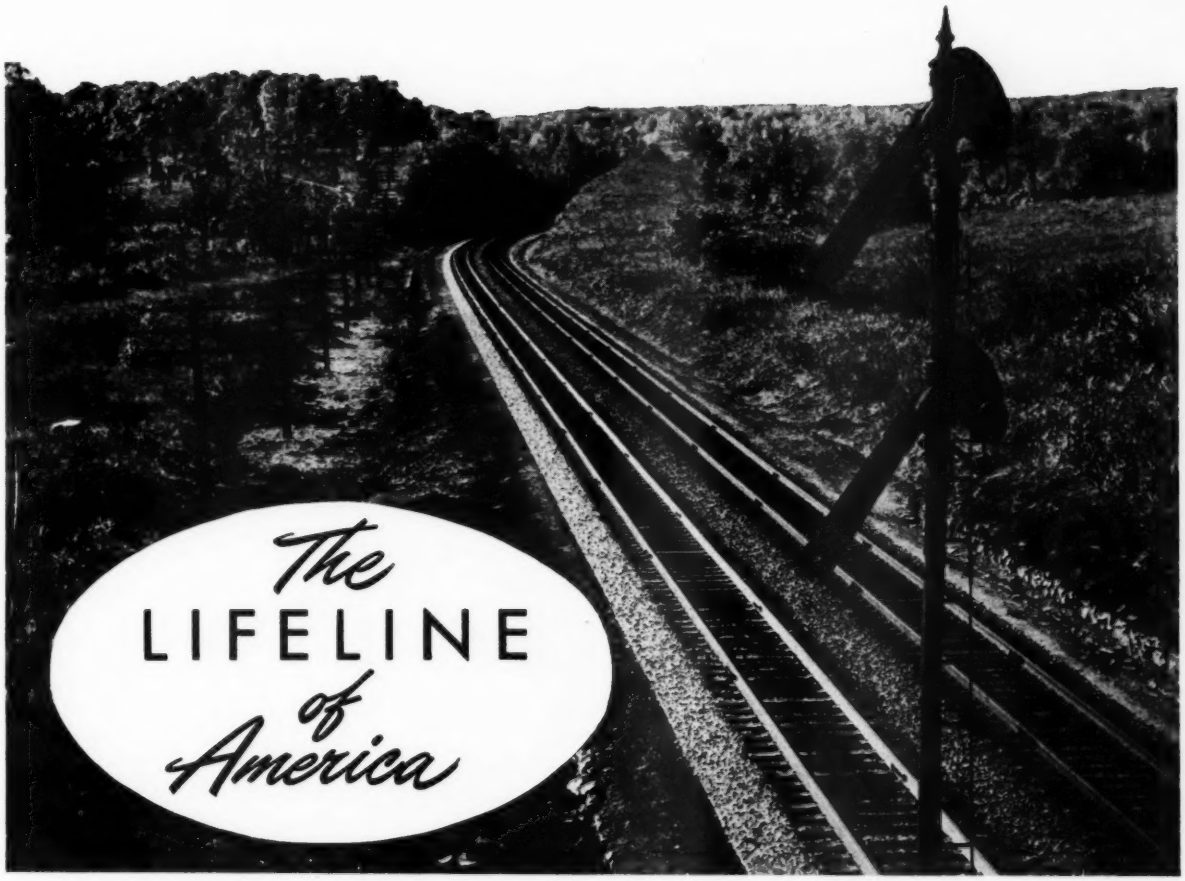
Regardless of traffic conditions no crossing or turnout frog can be maintained in serviceable condition as economically by removing it from track for welding as by keeping it in safe, smooth-riding condition "in track under traffic". Such track units "wear in", as it were, in their respective locations. Welding and grinding operations can be held to the minimum, both as regards the amount of work required and the total cost if the work is done " in track". By comparison, the effectiveness of the work done out of track is inadequate and the cost of removal and replacement, plus welding repairs, amounts to absurd proportions, whereas units can be reconditioned in track at less cost than that of handling them if they are removed.

To avoid welding "too soon or too late" and to assure maximum service life per dollar, continual regular inspection by qualified, specially trained personnel is recommended. Except in cases of extreme emergency no track unit should be welded prior to inspection. Welding should be scheduled so that track units will be serviced within 30 days after inspection. By following such planning and inspection under control of specialists, there will be no reason for doubt as to whether or not welding has been performed at the most appropriate time. There should be no difference of opinion on the subject of when to do the welding—for maintenance welding should be begun on every frog and crossing as soon as damaging batter becomes apparent. "Damaging batter" is not difficult to ascertain through regular, periodic inspection. It definitely is neither safe nor economical to allow crossings or frogs to remain in service without attention until the "batter areas" require major welding repair jobs.

Special attention should be given to wide-angle crossing frogs at the time of inspection to assure keeping them built up to a smooth riding condition. Once heavy batter begins, the deterioration is rapid, especially under heavy fast traffic.

It may be a debatable question as to what depth of batter indicates that the time has come to build up the affected area. High-manganese-steel track units pass through a work-hardening stage under traffic and each unit shows the effects

(Continued on page 286)



Lackawanna track scene

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according to the nature of the individual casting. The lowered surface due to work hardening remains fixed for a much longer time than it took to reach the stage of maximum hardness. When the work-hardened areas begin to crack, chip and break through, the time has come to build up by welding. Signs of weakened resistance in the comparatively thin surface layer of hardened steel are apparent before the cracking, chipping and breaking out become exaggerated. Hence, periodic inspections provide for scheduling welding repairs at approximately the right time to insure against waiting too long or welding too soon.

The "shell" of over-hardened surface metal should be ground off and welding performed on the exposed surface of the original structure. The affected areas can, by proper welding procedure, be restored to surface level even with the thin existing "worn surface level" of the frog. Weld deposits should, of course, be ground uniformly to smooth surfaces. In building up "batter areas" the weld deposits should be ground to provide for smooth riding according to the worn surface level of adjacent areas of each wing separately. The point should be ground to work with the lowest wing. When traffic is predominantly greater over one wing than the other, the batter areas in the lower wing and point should be ground to the same level, allowing the high wing to remain "as is".

When crossings and frogs are removed from track because heavier rail is laid, these units should, of course, be reconditioned for use at new locations. Care should be taken to limit rehabilitation of such units to the restoration of battered and damaged areas only.

Condition Determines Method

By A. DRAGER
M/W Storekeeper, Central Railroad of New Jersey, Elizabethport, N. J.

In places where manganese crossing frogs are subjected to fast, heavy traffic, and it is not possible to obtain sufficient time to do the welding job under traffic, then it is best to take the frog out of track. When this is done it is necessary to have an emergency frog or spare section on hand.

The defects in manganese crossing frogs may be classified as:

(1) Vertical cracks, most of which start at the base and go upward, and some of which occasionally start at the head and go down. These cracks are of minor importance in the beginning, but keep on developing and eventually become of major importance.

(2) Horizontal cracks, generally under the head, which often are not easily detected. They keep extending and if not repaired may cause sections of the manganese to break out.

(3) The most serious defect occurs when a piece suddenly breaks out of the head. Repairs must then be made promptly.

The condition of the frog determines whether the welding is to be done in or out of track. In most cases, the frog can be set off in the vicinity and the welding done on the job. This is the most economical procedure. On the other hand if the amount of welding is large and other repairs are required, it is advisable to take the frog to a shop for major repairs.

Welding the frog on the job out of track requires that the welding equipment be hauled to the location where the repair is to be made. This may be expensive. On the other hand, getting the frog into the repair shop may cost just as much. Economy factors should govern in each case.

The most economical procedure is to stop the minor cracks before they become large enough to present a serious problem and at the same time strengthen any existing weaknesses in the subgrade, surface, or alinement.

Frequently a large heavy plate placed under the base of the frog will provide stronger support and give larger distribution of the load, eliminate cracks and result in longer service life for the frog.

***TEST APPLICATION OF BRUSH-KILLING CHEMICALS**—Along the tracks of the Great Northern near Fargo, N. D., a variety of chemical brush killers is being tested under the supervision of R. R. Manion, engineer maintenance of way at the road. The materials under test include the amine and ester combinations of 2,4-D and ammonium sulfamate. Each of these chemicals was sprayed on a separate half-acre plot of brush under telegraph lines. After the start of the growing season this spring, the plots will be examined to determine which material did the best job of brush destruction.*

Shown above examining results 30 days after the chemicals were applied are Professor John Zaylskie (left), extension forester of the North Dakota Agricultural College, and Ardon Aanestad, technical service representative of E. I. DuPont de Nemours & Co.

THE MONTH'S NEWS

Railway Personnel

General

W. C. Baisinger, superintendent of the Western division of the Atchison, Topeka & Santa Fe, at Dodge City, Kan., and formerly division engineer on that road, has retired after 43 years of service.

George R. P. Graham, superintendent of the Port Arthur division of the Canadian National, at Port Arthur, Ont., and formerly a roadmaster on that road, has been promoted to general superintendent of the Alberta district, with headquarters at Edmonton, Alta.

Frank J. Jerome, vice-president of operations and maintenance of the New York Central, has been promoted to executive vice-president, with headquarters as before at New York.

Engineering

A. C. Danks, Jr., resident engineer on the Union, has been promoted to bridge engineer, with headquarters as before at East Pittsburgh, Pa.

W. N. Downey has been appointed bridge engineer on the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn.

William E. Manning, track supervisor on the Danville division of the Southern, at Salisbury, N. C., has been appointed chief engineer of the Atlantic & Danville.

T. P. Polson has been appointed engineer maintenance of way and **H. K. Hislop,** assistant to engineer maintenance of way, of the New York, New Haven & Hartford, both with headquarters at New Haven, Conn.

C. S. Colvin has been appointed engineer structures on the Missouri Pacific, with headquarters at Houston, Tex., succeeding **R. E. Caudle,** who has been granted a leave of absence because of ill health.

William Patterson, supervisor of track on the Canada division of the Michigan Central, has been promoted to assistant division engineer, with headquarters as before at St. Thomas, Ont.

I. D. Talmadge, roadmaster on the Lehigh & Hudson River, has been appointed engineer maintenance of way, with headquarters as before at Warwick, N. Y., succeeding **J. Nelson Shaw,** who has been named engineering assistant.

L. E. King, assistant supervisor of track on the Pittsburgh & Lake Erie, has been appointed field engineer, with headquarters at Pittsburgh, Pa., succeeding **Ross E. Taggart,** who has retired after more than 44 years of service.

W. E. Mercer, engineer on the new boiler power plant of the Canadian Pa-

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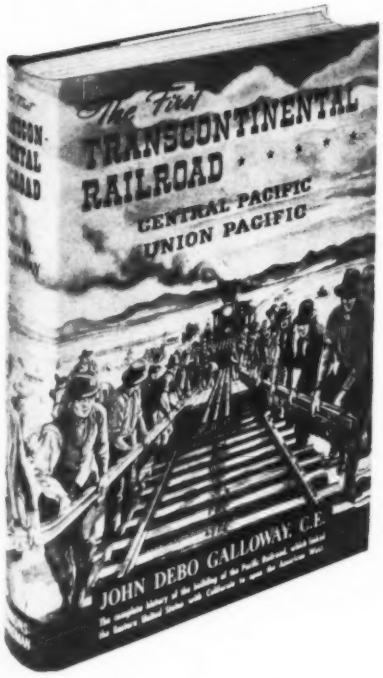

By JOHN D. GALLOWAY, C.E.

The construction of the Union Pacific and Central Pacific railroads linking Omaha with Sacramento was the crowning achievement of the railroad era. It was considered by the author the greatest engineering project of the Nineteenth Century.

The author for more than forty years was a leading consulting engineer of San Francisco. He was thoroughly familiar with the original routes of both railroads. While gathering manuscript material he carried on an extensive correspondence with relatives of the builders. Many of the authentic photographs showing construction methods were from his private collection.

The individual contributions of railroad engineers, construction company heads and railroad officials who had a part in this great project are objectively appraised. Biographical sketches of the more prominent engineers and railroad builders of the era are included.

Contents

The Pacific Railroad—The Origin and Development of Railroads Prior to 1870—Early Projects and the Pacific Railroad Surveys—The Builders of the Central Pacific Railroad—The Central Pacific Railroad Company—Locating the Central Pacific Railroad—Constructing the Central Pacific Railroad—The Builders of the Union Pacific Railroad—The Union Pacific Railroad Company—Locating the Union Pacific Railroad—Constructing the Union Pacific Railroad.

320 pages, 73 photographs, 4 maps, bibliography, index

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Reviews

"The story of these railroads had been told many times. However, few authors approached the Herculean project with the same appreciation of the problems involved as has Galloway. You are left with the firm belief that building this first transcontinental railroad was truly the greatest engineering feat of the 19th Century." Engineering News-Record.

"At Promontory, Utah, there stands a great stone monument to the Last Spike which joined the two branches of this nation's first cross-continental railroad. The story of the Central Pacific's long trek over the Sierras from Sacramento eastward and of the corresponding labors of the Union Pacific's workers who worked west from Omaha is one of the greatest chapters of nineteenth-century progress. This story, this epic of Americana, is told from the viewpoint of a civil engineer. —The Argonaut.

"Galloway rates as one of the great engineers who had an important part in the development of Western America. As an authoritative record of one of the nation's greatest engineering achievements, his book is a basic contribution to the literature of American railroading."—Southern Pacific Bulletin.

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R. E. & M. 3-51

cific at Winnipeg, Man., and, for the past two months, relieving roadmaster for terminals there, has been promoted to division engineer of the Terminals division at Fort William, Ont., succeeding **H. H. Tripp,** who has retired under the pension regulations of the railway after 41 years of service.

John E. Hoving, district engineer of the Northern Pacific at St. Paul, Minn., has been appointed to the newly-created position of special engineer to the president. He is succeeded by **D. H. Shoemaker,** principal assistant engineer at St. Paul, who is in turn succeeded by **W. R. Bjorklund,** office engineer at that point. **J. A. Young,** division engineer at Spokane, Wash., becomes Mr. Bjorklund's successor.

J. E. Bernhardt, engineer of structures of the Chicago & Eastern Illinois, at Danville, Ill., has retired. Mr. Bernhardt was born at Terre Haute, Ind., on May 11, 1888, and was educated at Wiley high school and Rose Polytechnic Institute. He entered railroad service in 1906 with the Vandalia (now Pennsylvania), with which road he remained until 1909 when he went with the Chicago, Milwaukee, St. Paul & Pacific in the office of the bridge engineer. He joined the C. & E. I. in 1910, and subsequently became bridge engineer. In 1949 his title was changed to engineer of structures.

G. W. Salmon has been appointed engineer of bridges of the Seaboard Air Line, at Norfolk, Va., succeeding **W. N. Downey,** who has resigned to accept

G. W. Salmon

employment with another railroad. Mr. Salmon began his railroad engineering career in 1929, and has had experience in bridge and structural design, and construction. For the past several years he has been associated with Schenley Industries, Inc., as supervising engineer at Los Angeles, Cal., and San Francisco.

As reported in the February issue, **George G. Amory** has been promoted to engineer maintenance of way of the Chicago & Western Indiana and the Belt Railway of Chicago, with headquar-

(Continued on page 290)

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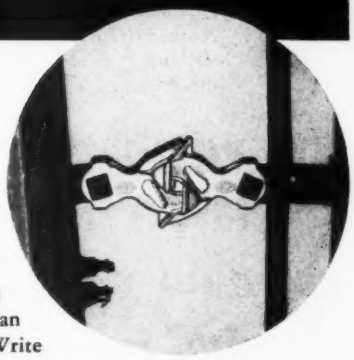

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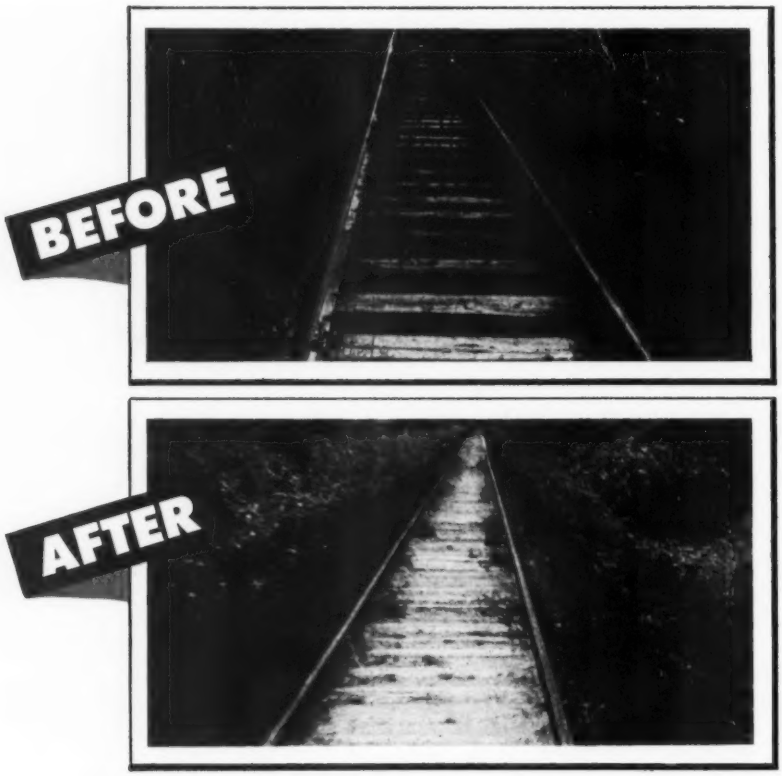

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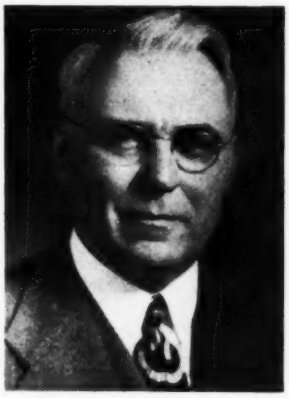
Railway Personnel (Cont'd)

ters at Chicago. Mr. Amory was born on July 22, 1889, at Evansville, Ind., and was graduated in civil engineering from Purdue University in 1912. In June of the same year he entered the



George G. Amory

service of the Chicago, Terre Haute & Southeastern (now Chicago, Milwaukee, St. Paul & Pacific), holding the positions of instrumentman, resident engineer, draftsman, office engineer and assistant to chief engineer. In 1921 he became employed as an engineer with Fred S. Jones, railroad contractor, and in 1922 went with the Dayton Scale Company as a salesman. Later he worked as a real estate salesman in Chicago, and in June 1923 joined the C. & W. I. and the Belt, with which he has served as assistant engineer, designer and office engineer, covering all phases of railroad construction, maintenance and planning. He held the position of office engineer prior to his promotion.

Ivan Allen Moore, who has been promoted to chief engineer of the Chicago & Eastern Illinois at Danville, Ill., as announced in the January issue, was born

Ivan Allen Moore

at Dearborn, Mo., April 14, 1896. He started with the C. & E. I. in November, 1920, as assistant in the engineering corps and subsequently served as bridge

inspector at Danville, being appointed supervisor of bridges and buildings at that point in 1933. From September, 1941, to April, 1946, he served as trainmaster at Salem, Ill., and then returned to Danville as special engineer. In September, 1946, he became senior assistant engineer, and in November, 1948, was appointed division engineer. Mr. Moore was advanced to assistant chief engineer in March, 1949, the position he held before his latest promotion.

E. A. Bleakley, assistant chief engineer of the Savannah & Atlanta, has been appointed chief engineer, with headquarters as before at Savannah, Ga., to succeed **J. A. MacLeod,** whose death was reported in the January issue.

Carl H. Vogt, assistant engineer maintenance of way of the Jersey Central Lines, has been appointed engineer maintenance of way, with headquarters as before at Jersey City, N. J., succeeding **Thomas E. MacMannis,** who, as noted elsewhere in these columns, has resigned to become engineer maintenance of way of the Reading. **Edgar T. Anderson,** assistant supervisor of track of the Central of New Jersey at Long Branch, N. J., has been appointed assistant engineer in the office of the engineer maintenance of way at Jersey City.

Carl H. Vogt

Mr. Vogt was born at Camden, N. J., on March 16, 1888, and graduated from Lehigh University in 1909. He began railroad service with the New York Central as a rodman in July of that year. In August, 1912, he was appointed assistant supervisor of track at Jersey Shore, Pa.; in January, 1914, assistant tie treatment inspector at Rome, N. Y.; in December, 1915, bridge inspector at Jersey Shore, and in January, 1923, supervisor of track at Rochester, N. Y. In January, 1930, Mr. Vogt went with the C. N. J. as supervisor of track at Jersey City, and was promoted to division engineer in July, 1945. He became assistant engineer maintenance of way on May 1, 1949, retaining that position until his recent promotion.

A. V. Johnston, formerly assistant chief engineer of the Central region of

(Continued on page 292)

DUFF-NORTON JACKS

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The New Aluminum

TRACK JACK

33⅓% Lighter in Weight

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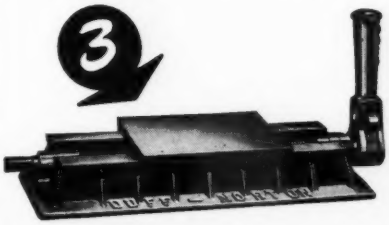

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Railway Personnel (Cont'd)

the Canadian National, with headquarters at Toronto, Ont., has been appointed assistant chief engineer system at Montreal, Que., succeeding **H. W. Flemming,** who has retired under the pension regulations of the railway.

Thomas E. MacMannis, engineer maintenance of way of the Jersey Central Lines, with headquarters at Jersey City, N. J., has been appointed engineer

Thomas E. MacMannis

maintenance of way of the Reading, at Philadelphia, Pa., succeeding **M. S. Miller,** who has been appointed special engineer. Mr. MacMannis was born on January 19, 1898, at Lonaconing, Md. After working as a rodman for the Cumberland & Pennsylvania for two years, he was graduated in civil engineering from Cornell University in 1922. In June of that year he joined the chief engineer's department of the Baltimore & Ohio and, on May 1, 1926, entered the service of the Jersey Central as assistant supervisor of track. In 1927 he was promoted to supervisor of track at Sommerville, N. J., and on July 9, 1941, was appointed division engineer at Jersey City. He was advanced to engineer maintenance of way in May, 1945.

R. H. Menary, whose appointment as division engineer of the Hornepayne division of the Canadian National, with headquarters at Hornepayne, Ont., was announced in the December issue, was born on June 3, 1918, at Hamilton, Ont. He attended Queens university, Kingston, Ont., from 1938 until 1941. In April, 1941, he was employed by the Auglin-Norcross Construction Company as a rodman and subsequently advanced through the positions of instrumentman and assistant engineer. In April, 1944, Mr. Menary entered the service of the Canadian National as an instrumentman, and in August, 1946, was promoted to acting assistant to the division engineer of the Belleville division, with headquarters at Belleville, Ont. He was appointed assistant division engineer of the Belleville division in 1948, which position he held at the time of his recent promotion.

B. F. Keays, whose promotion to division engineer of the New Glasgow division of the Canadian National, with headquarters at New Glasgow, N. S., was noted in the December issue, was born at Matapedia, Que., and entered railway service in 1939 as a timekeeper in the track department of the C.N.R. at Newcastle, N. B. Shortly thereafter he left the railroad, but returned the following year as a timekeeper on the Harcourt subdivision. In June, 1943, he became a draftsman in the engineering department at Campbellton, N. B., and in June, 1944, was advanced to instrumentman, transferring to Edmundston, N. B., in March, 1947. In November, 1948, Mr. Keays was appointed assistant division engineer of the Moncton division, at Moncton, N. B., retaining that position until his recent promotion.

Track

R. E. Clancy has been appointed assistant roadmaster on the First, Second and Lamesa districts of the Slaton division of the Atchison, Topeka & Santa Fe.

T. P. McCue has been appointed roadmaster on the Atchison, Topeka & Santa Fe, with headquarters at Prescott, Ariz., succeeding **J. E. Eisemann,** who has been assigned to other duties.

Martin A. Golden, track foreman on the Central of New Jersey at Dunellen, N. J., has been promoted to assistant supervisor of track at Long Branch, N. J., succeeding **Edgar T. Anderson,** whose appointment as assistant engineer is announced elsewhere in these columns.

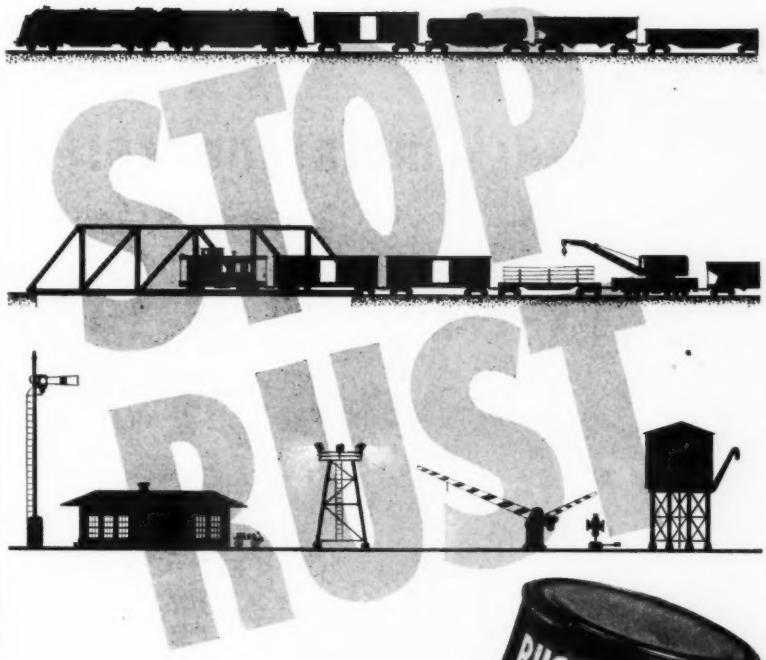
T. D. Kern, assistant supervisor of track on the Illinois Central, with headquarters at Waterloo, Iowa, has been promoted to supervisor of track, with headquarters at Mendenhall, Miss., succeeding **H. F. Davenport,** who has been transferred to Tutwiler, Miss. Mr. Davenport replaces **D. H. Yazell,** who has entered military service with the U. S. Marine Corps.

I. H. Weaver, assistant supervisor of track on the Northern subdivision of the Chesapeake & Ohio, with headquarters at Chillicothe, Ohio, has been promoted to supervisor of track. **L. E. Williams,** assistant cost engineer on the Northern subdivision, has been appointed assistant supervisor of track to succeed Mr. Weaver.

T. W. Hicks, locating engineer on the Edmonton division of the Canadian Pacific, has been promoted to roadmaster at Wilkie, Sask., succeeding **Ivar Ljunggren,** who has been transferred to Saskatoon, Sask., as roadmaster on the Sutherland subdivision, to succeed **Charles Johnson,** who has retired after 44 years of service.

C. G. Knight, junior engineer on the Pennsylvania, with headquarters at Lockhaven, Pa., has been promoted to

(Continued on page 294)



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Speeds surfacing, lining or tie plate removal. Capacity, 15 tons; lift, 5"; weight, only 28 lbs.

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Railway Personnel (Cont'd)

assistant supervisor of track, with headquarters at York, Pa., succeeding **A. T. Richards,** who has been transferred to Harrisburg, Pa. Mr. Richards succeeds **J. G. Wilson,** who has been promoted to supervisor of track at Anderson, Ind., to replace **Peter Di Paola,** who has been transferred to Crown Point, Ind. Mr. Di Paola succeeds the late **John Nowviskie. L. E. Williams, Jr.,** has been appointed assistant supervisor of track on the Conemaugh division, succeeding **J. A. Meyers, Jr.,** who has entered military service.

D. A. Webster, whose promotion to supervisor of track on the Delaware & Hudson at Whitehall, N. Y., was reported in the February issue, was born at Evansville, Ind., on May 24, 1924, and graduated in civil engineering from Rensselaer Polytechnic Institute in June, 1948. He worked as a chainman with the New York Central during the summer of 1947, and on July 1, 1948, following graduation, he entered the service of the D. & H. as a levelman at Oneonta, N. Y. Mr. Webster was advanced to assistant engineer at Albany, N. Y. on September 1, 1949, retaining that position until his appointment as track supervisor on January 1, 1951.

David Wetterau, whose promotion to supervisor of track on the Southern at Selma, Ala., was reported in the January issue, was born at Brooklyn, N. Y., on May 13, 1923, and graduated from the University of Alabama in September, 1947, with a degree of Bachelor of Science in civil engineering. He entered the service of the Southern on October 16, 1947, as a student apprentice at English, Ind. He was advanced to assistant supervisor at Slidell, La., on November 1, 1948, and was transferred to Somerset, Ky., on June 14, 1949. Mr. Wetterau was appointed assistant track supervisor at Dayton, Tenn., on October 1, 1950, and retained that position until his recent promotion.

Water Service

T. E. Little, supervisor of water service on the Canadian National at Montreal, Que., retired recently after 41 years of service.

Obituary

H. Heels, retired roadmaster on the Canadian National, died recently at Orillia, Ont., at the age of 79, and **C. Story,** retired roadmaster, died at Westminster, B. C., at the age of 80.

William Mahone, senior assistant engineer in the maintenance-of-way department of the Atlantic Coast Line, and for several years roadmaster at Petersburg, Va., and Goldsboro, N. C., died recently.

Association News

American Railway Engineering Association

The program of the association's fiftieth annual convention, to be held on March 13-15 at the Palmer House, Chicago, is reproduced on page 240 of this issue. All bulletins containing committee reports are now in the hands of members, and the yearbook is expected to be mailed out well in advance of the meeting.

Roadmasters' Association

Under the direction of President C. Halverson the Executive committee will hold a meeting at the Chicago Engineers' Club on March 12. In addition to routine business, preliminary plans for the convention to be held in December will be given consideration. All

(Continued on page 296)

Meetings and Conventions

American Railway Bridge and Building Association—Annual meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn Street, Chicago 5.

American Railway Engineering Association—Annual Meeting, March 13-15, 1951, Chicago. Neal D. Howard, Secretary, 59 E. Van Buren Street, Chicago 5.

American Wood-Preservers' Association—Annual meeting, April 24-26, 1951, Stevens Hotel, Chicago. H. L. Dawson, Secretary-treasurer, 839 Seventeenth Street, N. W., Washington 6, D. C.

Bridge and Building Supply Men's Association—L. R. Gurley, Secretary, 201 North Wells street, Chicago 6.

Maintenance of Way Club of Chicago—Next meeting March 26, 1951. E. C. Patterson, Secretary-treasurer Room 1512, 400 W. Madison street, Chicago 6.

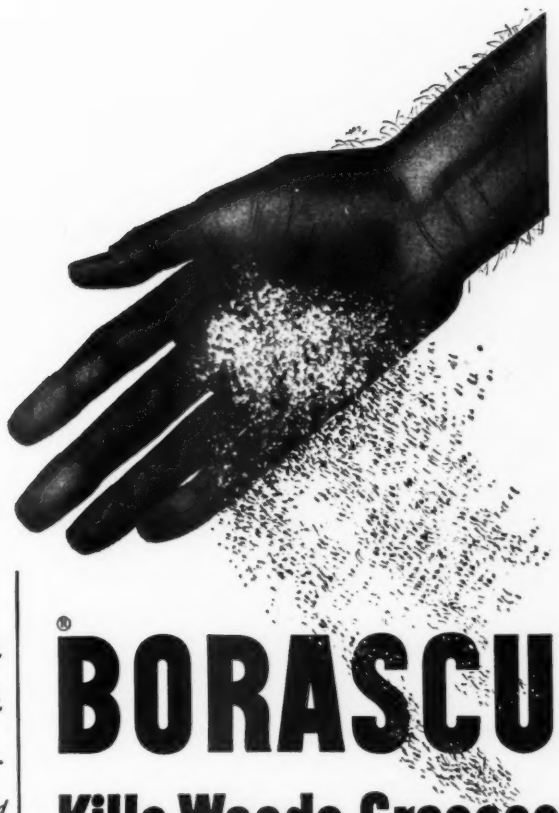
Metropolitan Maintenance of Way Club—Secretary, 30 Church street, New York.

National Railway Appliance Association—Robert A. Carr, Secretary, 310 South Michigan avenue, Chicago 4; Lewis Thomas, Assistant Secretary, 59 East Van Buren street, Chicago 5.

Railway Tie Association—Annual meeting September 25-27, 1951, Netherland Plaza Hotel, Cincinnati, Ohio. Roy M. Edmonds, Secretary-treasurer, 912 Shell Building, St. Louis 3, Mo.

Roadmasters' and Maintenance of Way Association of America—Annual Meeting September 17-19, 1951, Stevens Hotel, Chicago. Elise LaChance, Secretary, 431 S. Dearborn street, Chicago 5.

Track Supply Association—Lewis Thomas, Secretary, 59 E. Van Buren street, Chicago 5.



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Association News (Cont'd)

technical committees to submit reports at that convention have now been organized and their work is under way.

Maintenance of Way Club of Chicago

With 130 members and guests in attendance the February meeting was held on the 26th at Eitel's restaurant in the Field building, Chicago. The speaker was C. E. Gipe, division engineer, Pennsylvania, Ft. Wayne, Ind., and the subject was "Maintenance Problems and Methods of Solving Them."

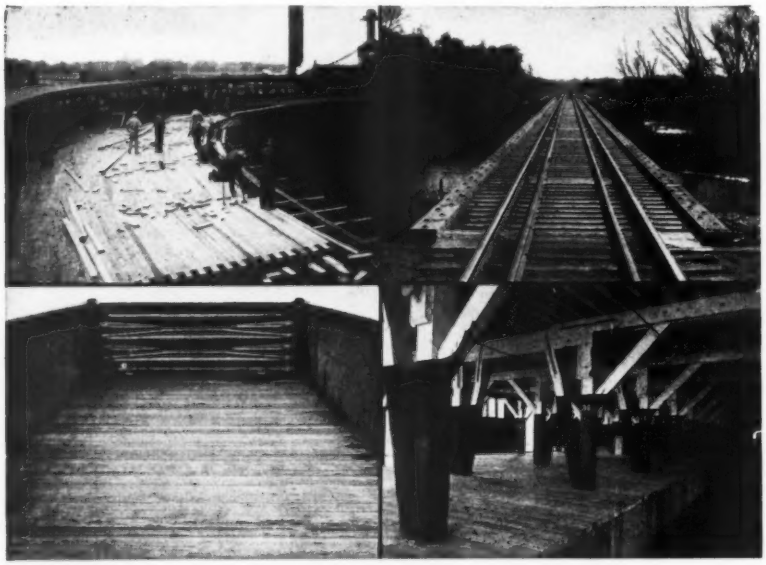
The next meeting will be held on March 26 at the same location. The speaker at that meeting will be G. M. Magee, research engineer, Engineering division, Association of American Railroads, who will discuss the findings of research relative to the improvement of joint maintenance.

Wood Preservers' Association

The annual meeting of the association will be held at the Stevens Hotel, Chicago, on April 24-26. Features of the program of particular interest to users of treated timber on the railways will be the three following papers: History of Union Pacific Timber Treatment, by W. C. Perkins, chief engineer, Union Pacific; Prevention of Mechanical Wear in Crossties, by A. E. Perlman, general manager, Denver & Rio Grande Western; and What's Ahead for Treated Wood in the Railroad Field, by T. A. Blair, chief engineer, Atchison, Topeka & Santa Fe System.

Bridge and Building Association

President Huckstep has called a meeting of the Executive committee to be held at the Chicago Engineers' Club on March 12, the day preceding the opening of the annual convention of the American Railway Engineering Association. Routine business will be discussed, including preliminary plans for the convention to be held in September. Consideration is being given in this connection to appropriate observance of the association's sixtieth anniversary. Organization of the technical committee has been completed and the reports to be presented at the convention are now in preparation.



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Supply Trade News

General

The **Black & Decker Manufacturing Co.**, Towson, Md., has opened a sales and service branch at 881 West Delavan avenue, Buffalo, N. Y.

The San Francisco (Cal.) headquarters of **J. H. Baxter & Co.**, producers of pressure-treated forest products, were moved recently to larger quarters in the Standard Oil Building, 200 Bush street, in that city. The move was necessitated by the expansion of business following the acquisition of a large wood preserving plant at The Dallas, Ore.

A. William Fraser, general European manager of the **Worthington Pump & Machinery Corp.,** has been appointed Midwest sales manager, with headquarters at Chicago.

Frank L. Murphy, chief engineer of the **Pullman-Standard Car Manufacturing Company,** Chicago, has been appointed assistant vice-president on the company's sales staff at Washington, D. C.

Lewis P. Favorite has been named manager of the New York district sales office of the **Aluminum Company of America,** succeeding **Edward B. Wilbur,** who has been elected president of the **American Lumber & Treating Co.,** Chicago, as announced elsewhere in these columns.

J. W. Buford, who has been on a leave of absence from his position as division engineer on the Pennsylvania, has

resigned from the railroad to become permanently associated with the **M. A. Hanna Company**, Cleveland, Ohio.

S. W. Hickey has been appointed assistant manager of the railroad products department of **Fairbanks, Morse & Co.** For 18 years he was associated with the Simmons-Boardman Publishing Corporation, and for one year served as manager of advertising sales for the transportation papers published by that company. Previous to his association with Simmons-Boardman, Mr. Hickey was employed by the Illinois Central.

S. W. Hickey

W. E. Miles, whose election to vice-president in charge of crawler-tractor and industrial sales for the **Oliver Corporation**, was announced in the February issue, became associated with the Oliver Corporation in 1919. During World War II he served on the Crawler Tractor Industry Integration Committee of the War Department, and on advisory committees of the War Production Board and the O. P. A.

W. E. Miles

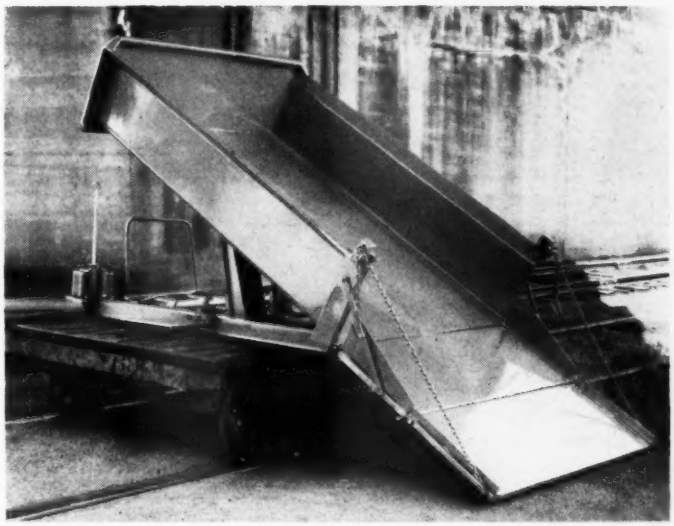
W. J. Behlke has been appointed a sales representative of the Railroad Tie Pad Division of the F. Burkart Manufacturing Company, with headquarters at St. Louis, Mo. Mr. Behlke will serve the railroads in a large area of the Midwest. A native of Clinton, Iowa, Mr. Behlke started his career as an apprentice on the Chicago & North Western in 1905, later becoming a machinist on that road. From 1919 to 1921 he served in a sales capacity with the Mudge Motor Car Company, and then left this concern to go with the Barco Manufacturing Company. Subsequently he became district sales manager for this company at St. Louis, which position he held until he retired in February 1950.

James L. Gibboney, formerly an assistant vice-president of the **National Aluminate Corporation**, with headquarters at Indianapolis, Ind., has been made a vice-president, railroad department, with headquarters at Chicago. Mr. Gibboney succeeds **Clarence B. Flint**, who, as announced in the February issue, has retired from full-time service, effective December 30, 1950. As vice-president of the company Mr. Flint was located at Chicago instead of Indianapolis, Ind., as erroneously stated in the February issue. Also, Mr. Gibboney, as assistant vice-president, was situated at Indianapolis instead of Chicago.

Mr. Gibboney joined the Nalco organization in 1932 following his graduation from Ohio State University. His first connection with the company was as a service engineer in the railroad department. In 1943 he was named assistant to the vice-president, and in 1947

(Continued on page 298)

How to Reduce Today's High Cost of Saving Money



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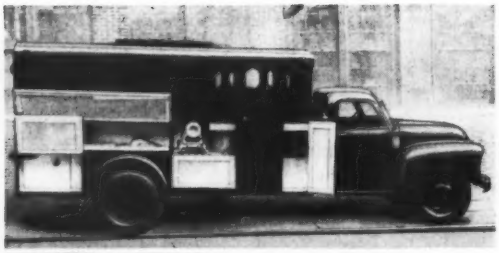

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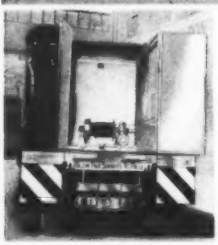

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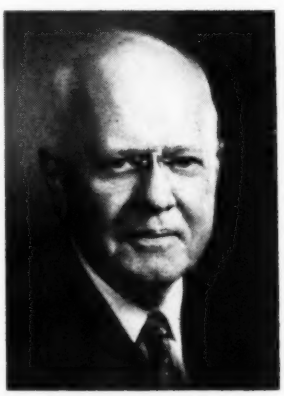
Supply Trade News (Cont'd)

he became an assistant vice-president with headquarters at Indianapolis. Mr. Gibboney has been directing the company's weed control program and will continue this activity in his new position.

James L. Gibboney

Mr. Flint was formerly a vice-president and director of the Paige-Jones Chemical Company, and became associated with Nalco in 1930 when Paige-Jones was acquired by that company.



Clarence B. Flint

Walter H. Knapp, Inc., Milwaukee, Wis., a firm of railroad builders and consultants, has announced the appointment of **William R. Powrie** as managing engineer of its newly-established Minneapolis-St. Paul (Minn.) office.

Stephen Sarnecke has been transferred from the Chicago headquarters of the **Vapor Heating Corporation** to Atlanta, Ga., to work with railroads in Georgia, Tennessee, Alabama and the Carolinas.

The appointments of **Worthington J. Gross** as manager, Governmental division, Washington, D. C., and **Bert C. Landstrom** as district representative in seven Eastern states and Northeastern Canada, of the **Athey Products Corportion,** Chicago, have been announced by T. V. Shea, general sales manager.

For additional information, use postcard, pages 211-212

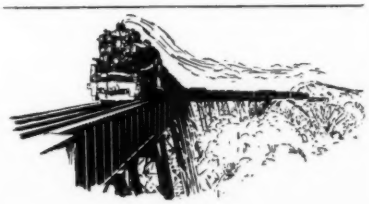
Edward B. Wilbur, for the past 30 years associated with the **Aluminum Company of America**, has been elected president of the **American Lumber & Treating Co.**, Chicago. He succeeds **J. F. Linthicum** who has retired from active management of the company, but will continue to serve as a director.

Mr. Wilbur began his career with Alcoa as a sales apprentice immediately after graduating from Oberlin College in 1920, and moved successively from

Edward B. Wilbur

sales jobs in Oklahoma and Texas to the management of the Alcoa Washington office during the pre-war and war years. He was made district manager at New York in 1943.

William A. Roberts, executive vice-president in charge of the tractor division of the **Allis-Chalmers Manufacturing Company** since 1947, has been elected president of the company, to succeed the late **Walter Geist**, whose death is reported elsewhere in these columns. The board also has elected four new vice-presidents and made other organizational changes, as follows: **W. C. Johnson**, formerly executive vice-president in charge of the general machinery division, appointed executive vice-president for the entire company; **J. L. Singleton**, formerly vice-president and director of sales, general machinery division, appointed vice-president in charge of that division; **Fred Mackey**, formerly general works manager, general machinery division, elected vice-president in charge of manufacturing, of the same division; **R. S. Stevenson**, formerly general sales manager, tractor division, elected vice-president in charge of the tractor division; **A. W. Van Hercke**, formerly director of engineering, tractor division, elected vice-president in charge of engineering of that division, and **John Ernst**, formerly general works manager, tractor division, elected vice-president in charge of manufacturing of that division.

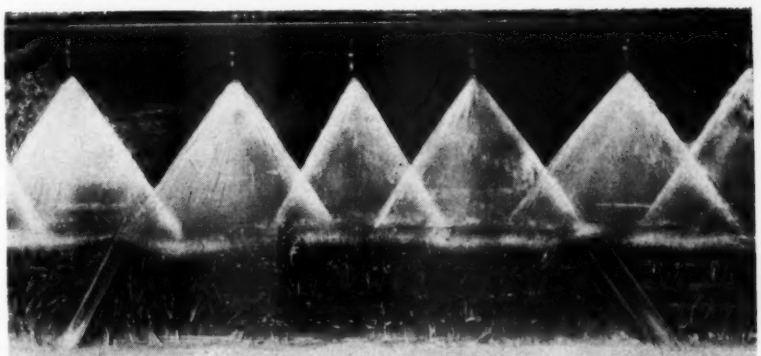


Obituary

Edward Joseph Helline, general sales manager of the Reliance Division of the Eaton Manufacturing Company, Massillon, Ohio, died on February 8 in the Massillon City Hospital, at the age of 48. Mr. Helline became associated with the Reliance Division 32 years ago as a mail clerk. Before assuming the position of general sales manager, he had advanced through the advertising and sales departments. Subsequently, he served as manager of the order and bill-

(Continued on page 300)

Edward Joseph Helline



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Supply Trade News (Cont'd)

ing department, manager of the service department, assistant to the general sales manager and assistant to the general manager, and was in charge of snap ring sales, engineering and production. He became general sales manager in June, 1947.

Walter Geist, 56, president of the Allis-Chalmers Manufacturing Company, Milwaukee, Wis., died on January 28.

Walter Geist

Mr. Geist joined Allis-Chalmers in 1909 and worked in the milling department as tracer, draftsman and engineer, successively, before his appointment as assistant manager in 1928. He later was transferred to the company's sales organization, and in 1933 was appointed general sales representative for the general machinery division. In 1939 he was elected a vice-president in the division and in 1942 was selected as executive vice-president. He was elected president of the entire company in May, 1942.

Trade Publications

(To obtain copies of any of the publications mentioned in these columns, use postcards, page 211)

Chemical Weed Control—Reade Manufacturing Company, Inc., has published a four-page bulletin on its product for killing brush on right of ways. The bulletin lists the plants most susceptable to the brush killer, and gives recommended methods of application.

Caterpillar Equipment—The Caterpillar Tractor Company has announced a new publication, entitled Service Reporter, which presents basic information and helpful hints on how to keep Caterpillar equipment in good working condition. The publication will be issued four times each year.

Lorain Cranes—The Thew Shovel Company has issued a 20-page, profusely illustrated bulletin covering the applications of Lorain cranes, including rubber-tired Moto-Cranes, self-propelled Lorains and crawler-mounted models, to industrial materials handling.

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Welded Rail—The Oxweld Railroad Service Division of the Union Carbide & Carbon Corp. is offering to railroad men and other interested persons an eight-page booklet entitled Progress in Rail Pressure Welding. Written by Lem Adams, vice-president of the division, the booklet reviews historical and modern practices in pressure welding rail and gives a brief resume of actual experience with this type of joint.

Welding and Cutting Torches—The Air Reduction Sales Company has announced a 36-page illustrated catalog covering Airco's complete line of welding and cutting torches, outfits, tips and accessories. Extensive charts showing the correlation of tips, mixers, extensions and torches; welding and cutting pressure charts; and cutaway views of various parts of the torches, are all included in the catalog.

Fire Protection for Bridges and Trestles—The Zone Company has published an eight-page illustrated bulletin describing the Libbey-Zone method of applying Zone heavy-duty coating and pea gravel to open-deck bridges and trestles to protect them against damage due to fire and weather. The bulletin also includes a brief case history of a railroad bridge which has been given the Libbey-Zone treatment.

Armco Installation Manual—Armco Drainage & Metal Products, Inc., has published a 46-page manual on the proper methods of installing Armco drainage structures, culverts, sewers and conduits. All important installation recommendations are illustrated by detailed sketches.

Onan Products—D. W. Onan & Sons, Inc., has prepared a 12-page booklet describing the entire line of Onan engines and electric generating plants available to the export market. Included in the booklet is a list of suggestions for negotiating export documents.

International Power Equipment—The International Harvester Company is offering a new folder entitled Make It the Workingest 40-Hour Week with International Off-Track Power, which describes and illustrates the use of International equipment on the nation's railroads.

American Steel Derricks—The American Hoist & Derrick Co. has published a 36-page catalog (No. 200-D-3) describing its complete line of steel derricks with capacities up to 250 tons. The various types of derricks are each treated in a separate section which includes complete specifications, outline drawings and operating pictures. Following these sections are complete construction details from boom point to sill connections. One page is devoted to the recommended method of determining boom lengths for lifting a required load to a predetermined height at a given radius.

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BURRO DOES EVERY JOB EFFICIENTLY, ECONOMICALLY

Whether the Burro is used to speed track laying or relocation, for bridge building, earth or ballast handling or on locomotive coaling jobs, it will handle every job more efficiently and economically—because Burro Cranes are built for railroad work.

Only* BURRO *cranes have:

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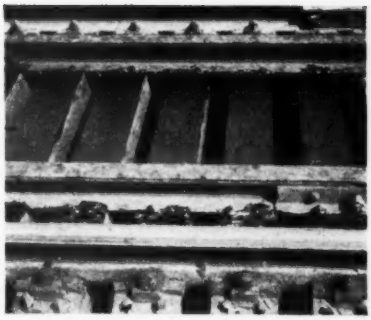

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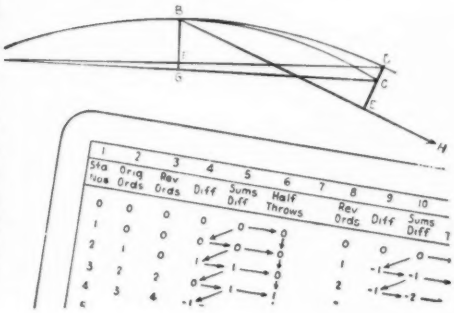
Including detailed examples with line drawings and calculation sheets, for simple, compound and reverse curves.



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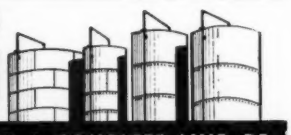

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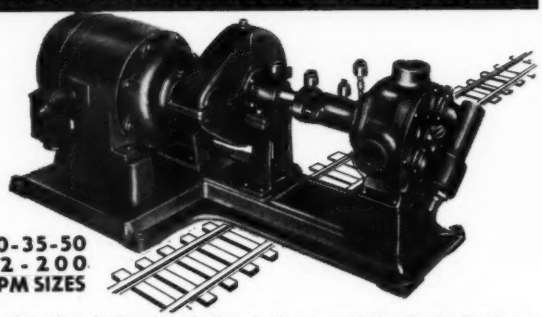

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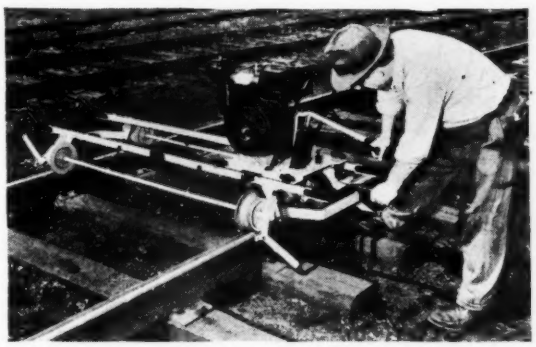

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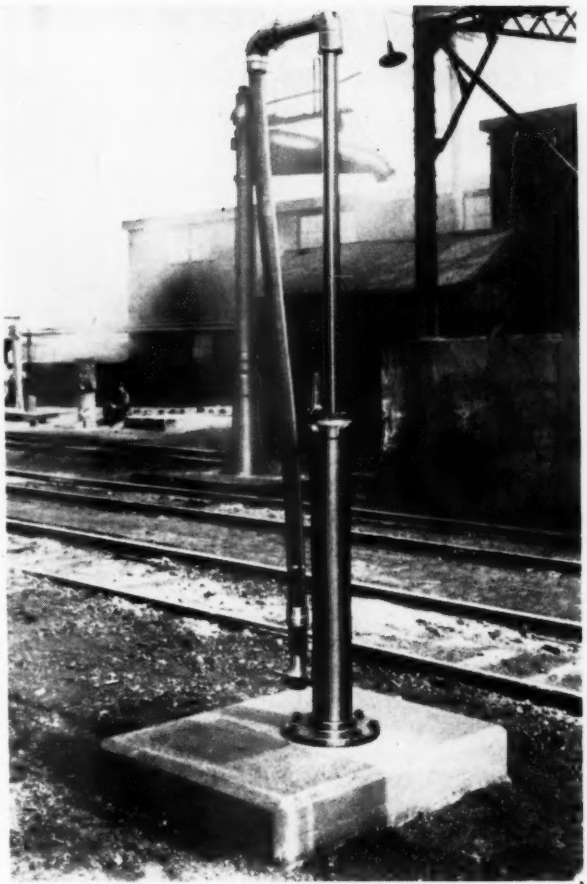

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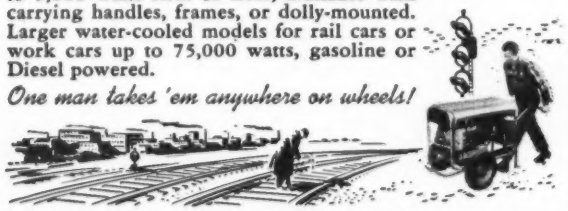

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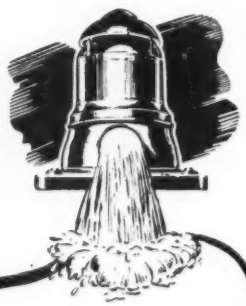

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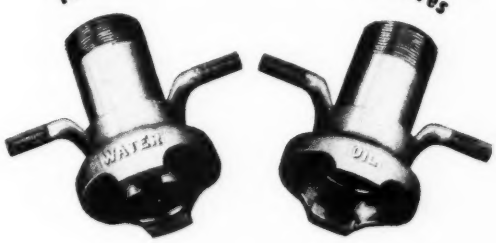
for servicing Diesel locomotives



eliminate the use of tools when Diesel locomotives are oil- or water-serviced.

eliminate waste of oil and water in servicing Diesels.

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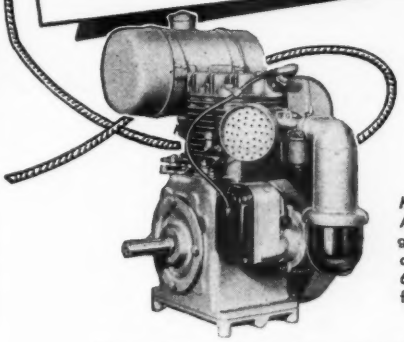

Models ABN and AKN 4-cycle, single-cylinder stand. ard engines, 3 to 6 hp. (See specifications)

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3. Maximum torque at usable speeds . . . most desirable for equipment that really has to go to work.

SPECIFICATIONS		Model ABN	Model AKN
Bore		2½"	2⅞"
Stroke		2¾"	2¾"
Piston Displacement—cu. in.		13.5	17.8
Horsepower	1800 R.P.M.	2.5	3.6
	2600 R.P.M.	3.7	5.3
	3000 R.P.M.	4.2	5.9
	3600 R.P.M.	4.6	6.2
Main Bearings		Tapered Roller	
Piston		Aluminum Alloy	
No. of Piston Rings		3	
Connecting Rod		Aluminum Alloy Babbitt Lined	
Crankshaft		Counterbalanced Heat Treated Drop Forging	
Cylinder Head		Aluminum, Removable	
Cylinder — Crankcase		Cast Iron	
Valve Seat Insert (Exhaust)		Nickel Chrome Molybdenum Iron	
Spark Plug Size		18 mm. Metric	
Fuel Tank Capacity		1 Gallon	
Weight — Lbs.	Net		Crated
Standard Engine	76		89

Our engineering department will be glad to co-operate with you in adapting Wisconsin Engines to your requirements. Write for further data.

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TIES AND TIMBERS

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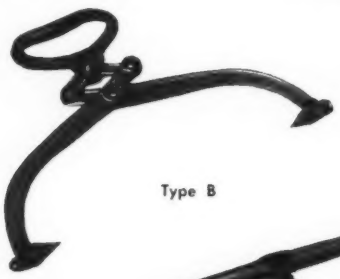
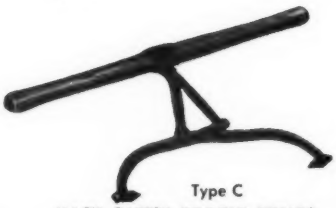
SAFETY
HAND TONGS

For the safe handling of railroad ties, bridge timbers, pulpwood, etc. Safe, positive, light-weight, high strength cast aluminum handle, steel tong and points.



Type B

Type A



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Three types. For use in the handling of railroad ties, bridge timbers, poles and other material.
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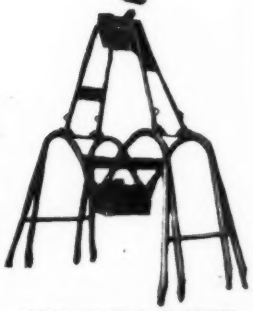

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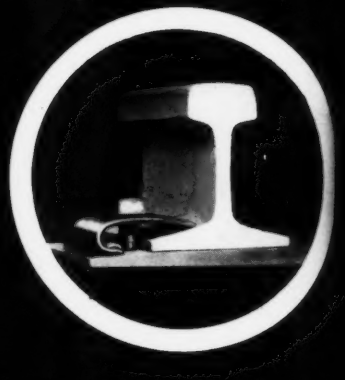

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